Egypt's Leading Oil And Gas Monthly Publication
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EGYPT OIL&GAS NEWSPAPER

Maria Hanssen:
DEA TO INVEST $500 MILLION IN EGYPT

EXCLUSIVE INTERVIEW

East Mediterranean Cooperation, an Interview with
CHARIS MORITSIS، CYPRIOT AMBASSADOR TO CAIRO

SOUTHERN MEDITERRANEAN LNG INFRASTRUCTURE:
Egyptian-Algerian Cooperation or Competition?

Assessing the Future Potential of Gaza Marine field

GAINS AND RISKS:
Beyond the Egypt-Israel Natural Gas Deal

IMPACTS OF LEBANON'S ROUTE TO OIL AND GAS

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EDITOR'S NOTE

After great natural gas discoveries in the Mediterranean Sea, the region's natural gas market started to rethink its dynamics. In this line, Egypt must give its neighbors special attention in order to identify potential partners and effectively face its competitors. Aiming at providing an in-depth look into the region's prospects and challenges, we have dedicated this issue to the oil and gas upstream activities in the Mediterranean countries, linking the region's operations to Egypt's plan of becoming an energy hub.

Our interview for this issue is with the Cypriot Ambassador to Cairo, Charis Moritsis, who commented on the cooperation opportunities between Cyprus and Egypt in the natural gas market, as well as on the recent Turkish resistance against the Cypriot exploration activities in the East Mediterranean waters. We have further included in this issue the valuable insights of Maria Moraeus Hanssen, DEA's CEO, who cordially invited Egypt Oil & Gas to a press conference during her visit to Egypt. Hanssen disclosed DEA's new investment plans for its portfolio in the country and shared the company's perspectives on the Egyptian petroleum sector.

Additionally, this issue offers you a comparison between the LNG terminals in Algeria and Egypt, providing an in-depth analysis on the possibility of competition or cooperation between both countries on natural gas exports. You can further have a full understanding of the recent natural gas agreement signed by Egypt and Israel, in addition to Lebanon's exploration activities and the technical aspects of deep-water reservoir recovery and facility maintenance.

Moreover, you can find in this issue information about Shell's divestment plans in the Gaza Marine field, as well as the Palestinian field's requirements to start production. As France recently announced the ban on exploration and production activities on the French territories starting from 2040, you can further understand whether France's decision is symbolic or can influence other countries.

It was a delight to prepare this issue and we hope you enjoy reading it. As always, thank you for your readership and suppo↵

EDITOR IN CHIEF

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EGYPT'S LEADING OIL AND GAS MONTHLY PUBLICATION

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Misr Petroleum Allocates EGP 155 M to Establish New Filling Stations

Misr Petroleum Company has allocated EGP 155 million for establishing 160 filling stations during fiscal year (FY) 2018/19 fiscal. The company has started to develop a number of its 1350 filling stations across the country, said Hussein Fathy, head of Misr Petroleum. The new filling stations will be constructed across 27 governorates in order to meet public demand for petroleum products. Fathy revealed that Misr Petroleum aims to increase its sales by 15% in 2018/2019, adding that the target is to sell 10 million tons during the FY. The company further plans to purchase 14 jet fuel stations and a maritime ship fueling station in Port Said.

Egyptian Natural Gas Output Increases by 23.9% Y.o.Y

Egypt's natural gas production increased by around 23.9% year-on-year (Y.o.Y) reaching 3.453 million tons in December 2017, compared to 2.787 million tons in December 2016. Meanwhile, consumption of natural gas in Egypt grew by 11.77% Y.o.Y to 3.6 million tons in December 2017, from the 3.25 million tons of natural gas consumed during the same month of the preceding year, according to the Central Agency for Public Mobilization and Statistics (CAPMAS). Natural gas output increased in December after a decline in November 2017 reaching 3.12 million tons from the 3.27 million tons produced in October 2017.

Egypt to Increase Oil Output by 1.5%

The Egyptian Ministry of Petroleum and Mineral Resources plans to increase crude oil production by around 1.5% to keep up with its strategy to boost production output. Output will then increase gradually throughout 2018 after March. "The production increase is based on recent new petroleum discoveries and the increase of investments of foreign companies in the development of the existing oil fields in the Gulf of Suez and the Nile Delta and concession areas of foreign investors," Ezz El Regal stated.

Egypt, EU to Sign Energy Agreement

Egypt will sign an energy agreement with the European Union (EU) before mid-2018. Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources, said that he expects the EU to become the main beneficiary of energy transported from Egypt. El Molla's statements came during his keynote speech in the International Petroleum Week, entitled "Egypt's Role in 2018 as a Regional Centre for Energy and Oil Trade". The minister said that Egypt has signed a preliminary agreement with Cyprus while the two sides negotiate a more comprehensive deal.

Diesel Consumption Falls by 4.46% Y.o.Y

Egypt's diesel consumption decreased by 4.46% Year-on-Year (Y.o.Y) from 1.278 million tons in December 2016, to 1.221 million tons in December 2017. Additionally, the North African country's output of diesel decreased by around 2.15% Y.o.Y reaching 546,000 tons of diesel in December 2017, compared to 558,000 tons during the same month of the preceding year, according to a report by the Central Agency for Public Mobilization and Statistics (CAPMAS). Diesel consumption in Egypt increased by 2.77% in one month as it had recorded 1.188 million tons in November 2016. Meanwhile diesel production slightly increased by around 0.37% as it had recorded 544,000 tons in November.

Egyptian Petroleum Products Output Increases by 1.5% Y.o.Y

Egypt's output of petroleum products increased by around 1.5% Year-on-Year (Y.o.Y) from 2.7 million tons in December 2016 to 2.8 million tons in December 2017. Meanwhile, petroleum products consumption in Egypt decreased by around 7.3% reaching 2.9 million tons in December 2017, compared to 3.17 million tons in the same month of the preceding year, according to a report by the Central Agency for Public Mobilization and Statistics (CAPMAS).

Egypt's Butane Imports Increase by 21.76% Y.o.Y

Egypt's butane imports increased by around 21.76% Year-on-Year (Y.o.Y), reaching 235,600 tons in December 2017 compared to 193,500 tons in December 2016. This comes despite the decrease in Egypt's butane consumption by around 2.72% Y.o.Y to be 375,800 tons in December 2017 from 386,300 tons in the same month of the preceding year, according to a report by the Central Agency for Public Mobilization and Statistics (CAPMAS). Meanwhile, butane production in Egypt remained the same in December 2017 as the same month last year, recording 154,800 tons. Egypt's imports of butane grew by around 21.88% in one month, standing at 193,300 tons in November 2017.

Aviation Ministry's Arrears for Petroleum Ministry Hike to EGP 7 B

The Egyptian Ministry of Civil Aviation's indebtedness to the Ministry of Petroleum increased to EGP 7 billion by the end of 2017. The information was revealed to the website by a source at the Ministry of Petroleum and Mineral Resources. The source added that the Ministry of Aviation continues to pay a small part of the invoice for the supply of petroleum products, despite its debt levels. Meanwhile, the Ministry of Transportation owed the Ministry of Petroleum EGP 2.6 billion by the end of 2017. The arrears of the industrial sector reached EGP 11 billion in the same time period.

AMOC Targets Nasdaq Bourse

Egypt's Alexandria Mineral Oils Company (AMOC) wants to list shares on the Nasdaq Dubai bourse. The company will try to make the move after they have issued Global Depository Receipts (GDRs) on the London Stock Exchange (LSE). In 2017, Nasdaq Dubai proposed that AMOC cross list some of its shares on the Dubai stock market. Earlier in 2017, Chairman of Egypt's AMOC, Amr Mostafa, said that the company was planning a secondary offering of 10-20% of its shares on the Egyptian Stock Exchange (EGX). It will also issue 10% of its shares as global depository receipts on the LSE, Africa M.E informed.

New Gas Market Regulatory Authority Holds First Meeting

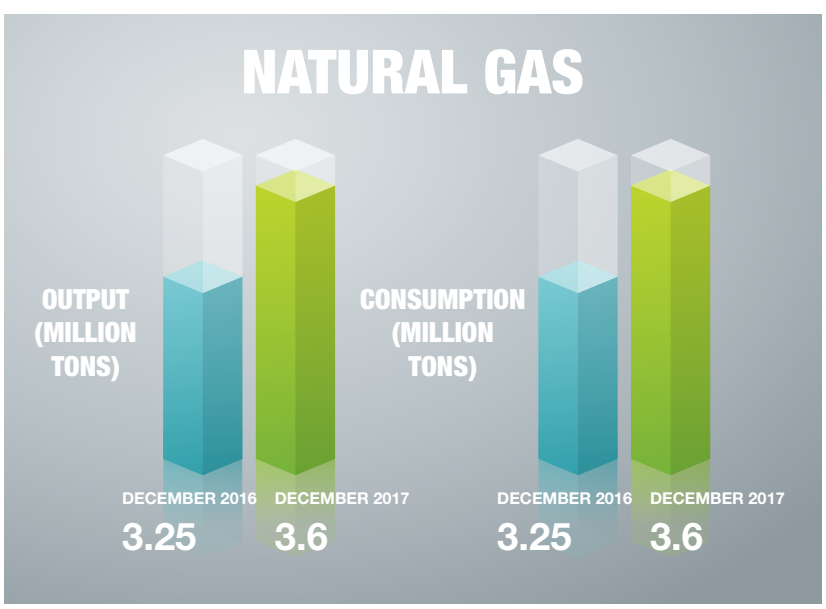
The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, chaired the first meeting of the new Gas Market Regulatory Authority's board of directors. The meeting was attended by the Executive Chairman of the Authority, Karem Mahmoud, and members of the board of directors. The board discussed how the authority will operate over the coming period and its responsibilities, which include the procedures for issuing, modifying and renewing. The meeting further discussed the procedures for suspending and canceling licenses for gas market activities. This included talking about the rules that licensed parties will need to comply with after fulfilling all the necessary requirements and approvals, as well as preparing the rules for the use of gas networks and facilities.

ELAB Exceeds Production Expectations in 2017

The Egyptian Linear Alkyl Benzene Company (ELAB) produced 116,000 tons of linear alkyl benzene during 2017, exceeding the planned output by 16%. The information was revealed by Hesham Nour El Din, head of ELAB, who added that the company successfully covered the local market's demands. The chemical is an important component in industrial detergents. Additionally, the company further marketed its heavy alkyl benzene output into the market and exported the surplus. ELAB's total export sales reached 87,000 tons in 2017, for $101 million. Almost three-quarters (72%) of the company's exports went to Europe.

Petroleum Ministry to End FSRU Contract

The Egyptian Ministry of Petroleum and Mineral Resources has announced that it will dispense with the Höegh Gallant floating storage and regasification unit (FSRU), a source at the Egyptian Natural Gas Holding Company (EGAS) said. The ministry will no longer use the ship, which is used to receive imported liquefied natural gas (LNG), by mid-2018. This comes after the successful linking of a number of new gas wells to production facilities, most notably north of Alexandria. EGAS signed the five-year contract to rent the FSRU back in November 2014, meaning the contract term will finish in 2019.



Botagasco Sells 83.9 M Butane Cylinders in 2017

The Egyptian Company for Gas Transportation and Delivery (Botagasco) sold 83.9 million butane cylinders in 2017, which is 20% higher than the 70.3 million cylinders sold in 2016. The company's revenues reached around EGP 2.646 billion. These figures were announced during the company's general assembly chaired by Head of the Egyptian General Petroleum Corporation (EGPC), Abed Ezz El Regal, in the attendance of Head of the Egyptian Natural Gas Holding Company (EGAS), Osama El Bakly. Botagasco's Board Chairman and Managing Director, Ahmed Abdel Moteleb, reviewed the company's annual report for 2017.

Egypt to Launch Oil Exploration Tender in H2 2018

Egypt will launch an oil exploration and production (E&P) tender and contract new firms during the second half of 2018, Egypt's Minster of Petroleum and Mineral Resources, Tarek El Molla, announced. "Petroleum E&P is based on scientific studies," El-Molla affirmed, noting that "there are many international companies that have advanced to research and explore in new areas after the discovery of Zohr field." One of the important results of the borders' demarcation in the Red Sea is that "Egypt successfully contracted with international oil companies for E&P in new areas," El Molla further stated.

Zohr Natural Gas Output to Reach 700 mscf/d in May

Egypt aims to increase production of its Zohr natural gas offshore Mediterranean field to reach 700 million standards cubic feet per day (mscf/d) in May 2018, said Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources. Egyptian President, Abdel Fattah El Sisi, inaugurated Zohr giant natural gas field earlier in 2018, in the attendance of Prime Minister, Sherif Ismail, Minister of Petroleum and Mineral Resources, Tarek El Molla, and Eni's CEO, Claudio Descalzi, as well other Egyptian ministers and leading figures from Eni, BP, and Rosneft.

EGPC Exports Bunker Fuel to Europe

The Egyptian General Petroleum Corporation (EGPC) is shifting into exporting bunker fuel instead of importing high sulfur fuel oil from Europe. Imports have been reduced because domestic natural gas is now meeting Egypt's needs and there is less demand. Traders stated that the change was adding to oversaturation of bunker fuel in the European market. EGPC offered around five 25,000 metric ton (mt) cargoes of RME 180 CST bunker fuel during the past few weeks, as it loaded free on board (FOB) in Alexandria or Suez, traders pointed out. EGPC recently released a tender to load RME 180 CST FOB Alexandria over April 3rd and April 5th.

Egypt's Natural Gas Output to Reach 6 bcf/d

Egypt's natural gas output is predicted to reach almost 6 billion cubic feet per day (bcf/d) by the end of fiscal year (FY) 2017/2018, said Mohamed Abdel Azzim, Deputy Head of the Egyptian General Petroleum Corporation (EGPC). Abdel Azzim added that nine natural gas projects are currently being completed in order to raise production, chiefly including the completion of phase one of Zohr natural gas field development project. The field started its early production in mid-December 2017, with a production capacity of 350 million standard cubic feet per day (mscf/d).

ERC Completes 96.5% of Mostorod Refinery

The Egyptian Refining Company (ERC) announced completing 96.5% of construction work for Mostorod refinery. The ERC has now spent $4.3 billion on the project. The ERC recently held its second annual conference for its "Future Teachers Program". This educational initiative includes awarding 30 teachers with scholarships to study in the American University in Cairo (AUC). The conference was held on March 5th within the ERC location, and allowed teachers to familiarize themselves with the latest and most important developments in this mega project, scheduled to open this year.

Mostorod Refinery to Start Operations Before 2019

The Mostorod refinery is projected to start operations by the end of 2018, said Mohamed Saad, Managing Director of the Egyptian Refining Company (ERC). The complex will have an annual production capacity at 80,000 tons of butane, 600,000 tons of jet fuel, 450,000 tons of coal, and 96,000 tons of sulfur. The refinery will pump 850,000 tons of benzene and around 2.3 million tons of diesel each year, which will result in lower import bills, Saad added. The company refines quantities of crude oil inside Cairo Oil Refining Company (CORC), Saad pointed out.

Egypt to Launch LNG Tender in Q2 2018

Egypt is preparing to launch a tender for purchasing cargoes of liquefied natural gas (LNG) in the second quarter (Q2) of 2018, to be received during the third quarter of 2018, an official at the Egyptian Natural Gas Holding Company (EGAS). The source didn't disclose any information about the number of cargoes. EGAS had arranged importing three LNG shipments from France's Engie, to be delivered during Q2 2018. The transaction was arranged in bilateral deals through a standard tender process.

El Molla Witnesses Signing of Natural Gas Initiative

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, along with Egyptian Minister of Trade and Industry, Tarek Kabil, witnessed the signing of the first phase of the "Towards Natural Gas" initiative. The initiative aims at turning 10,000 vehicles to operate with natural gas, and funding 50 vehicle oils warehouses with total EGP 100 million over several phases implemented by Egyptian International Gas Technology Company (Gastec) and the Natural Gas Vehicles Company (Car Gas). The initiative was signed by Egyptian Micro, Small & Medium Enterprise Development Agency (MSMEDA)'s Director Nevine Gamea; and Gastec's Head, Abdel Fattah Farahat.

Midor Refines 40.5 M Barrels of Crude Oil in 2017

Middle East Oil Refinery (Midor) refined 40.5 million barrels of crude oil in 2017 and contributed in providing over 3 million tons of different petroleum products to the local market worth around $1.4 billion, according to Mohamed Abdel Aziz, Midor's Head. The refinery further exported 1.7 million tons of petroleum products for $860 million, Abdel Aziz added during the general assembly chaired by Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the company's 2017 results. Abdel Aziz pointed out that Midor is continuing to carry out the expansion project in order to increase production capacity by 60% according to the specified time schedule.

Egypt Gas Profit Increases by 6% in 2017

Egypt Gas Company announced profits increased by 6% Year-on-Year (Y.o.Y) to reach EGP 25.6 million in 2017, compared to EGP 24.14 million in 2016. The state-owned company's revenues increased to EGP 1.76 billion during 2017, from EGP 1.52 billion during the preceding year. During the first nine months of 2017, which ended in September 2017, Egypt Gas encountered 17.05% losses, reaching EGP 58.98 million from EGP 50.39 million during the same period of the previous year. Later in 2017, Egypt Gas signed a cooperation protocol worth EGP 66.9 million with Egypt's New Urban Communities Authority (NUCA).

Egypt Connects 8.5 M Households to National Gas Grid

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, reviewed the ministry's strategy to connect total of 1.35 million households to the national natural gas grid in 2018 in replacement of butane. El-Molla reviewed procedures taken in order to boost the natural gas delivery rates and the volume of work in the activities of connecting households to the grid during the coming period, in order to keep pace with the ministry's ambitious plan. The minister further discussed the current situation in the field of natural gas delivery. The number of households connected to the natural gas grid reached around 8.5 million units across the country, including 883,000 in Upper Egypt.

Egypt to Launch New Red Sea E&P Tenders for 2018

Egypt will open new bids for exploration and production (E&P) activities in new areas of the Red Sea in 2018, after collecting data and granting international oil companies (IOCs) a chance to review and evaluate these data, stated Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources. El Molla's comments came as he checked the $750 million geophysical data compilation project implemented by the consortium of WesternGeco, Schlumberger, and TGS for Egypt's territorial water in the Red Sea. El Molla pointed out the importance of the data collection project in attracting international E&P companies to achieve new discoveries that contribute to increasing Egypt's proven reserves and production.

Egypt Reviews Toyota's Feasibility Study for Refining, Petrochemical Complex

The Egyptian Minister of Petroleum Tarek El Molla has discussed Toyota's feasibility study for establishing a refining and petrochemical complex in Suez with company officials. The minister met with a company delegation that included Senior Managing Executive Officer and Chief Division Officer of Machinery, Energy & Project Division, Toshiro Hidaka, to review the study. The meeting attendees agreed to hold another meeting to study in detail the economic indicators, investments and raw materials needed for such a project. During the meeting El Molla announced that there would be more investment opportunities in the coming period in the field of refining and petrochemicals.

Ethydco Sells 351,000 Tons of Polyethylene in 2017

The Egyptian Ethylene and Derivatives Company (Ethydco) sold 351,000 tons of polyethylene in 2017, 89,000 tons of which were sold in local markets, stated Abdel Megeed Hegazy, Head of Ethydco. The company also sold around 5,600 tons of butadiene and 3000 tons of paraffin, said Abdel Megeed during the general assembly. The meeting was chaired by Egyptian Minister of Petroleum and Mineral Resources Tarek El Molla to review the company's results for 2017. Integration with the oil companies in the Alexandria region will support the project and help employees cope with the global developments in the petrochemical industry, Abdel Megeed added.

Egypt Signs Engineering Consulting Contract Phosphoric Acid Project

Engineering for the Petroleum & Process Industries (Enppi)'s Head, Mohamed Hathout, signed an engineering consulting contract with Juansimon Arteaga Puente, Senior Manager of Business Development of Middle East and North Africa at Fluor Corporation, for the phosphoric acid production project, which is being implemented in Abu Tartour area at the New Valley governorate. The contract was signed in the presence of Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla. The phosphoric production project's investment cost reaches $750 million with 1 million tons annual production capacity of phosphoric acid.

Egypt, Italy Talk Investments

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, met with Italian Ambassador to Egypt, Giampaolo Cantini, to discuss increasing possible cooperation and investments of Italian firms, including Eni, Edison, and Technip in Egypt's offshore and onshore concession, as well as the successful achievements of these companies during its work in the North African country. The meeting reviewed the investment opportunities available in various oil and gas activities during the upcoming period, as well as the economic reforms that have been made to encourage and attract more petroleum investments.

Gasco Distributes 58 bcf Natural Gas in 2017

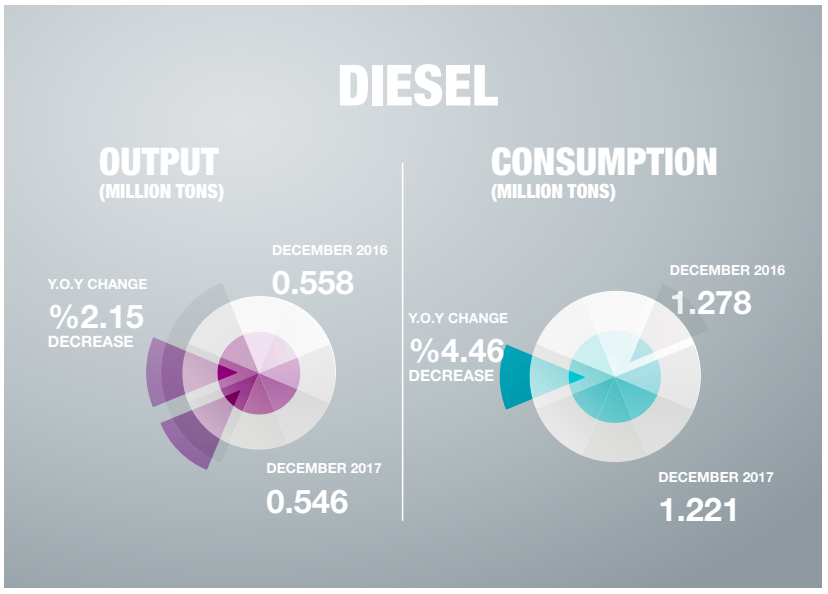
Egyptian Natural Gas Company (Gasco) successfully received and distributed 58 billion cubic feet (bcf) of natural gas to different sectors of the local market during 2017, stated Hisham Radwan, Head of Gasco, pointing out that the company's priority was to secure the needs of the electricity sector, which made 62% of the market's total consumption, and to secure mazut as an alternative fuel. This came during the general assembly chaired by Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the company's 2017 results. Radwan pointed out that the company added 14 new consumers to boost its clients to 527 consumers by the end of 2017.

Nidoco West-7 Well Comes Online

Egypt's Nidoco West-7 well, in Nooros Fied, came online with production rates at 90 million standard cubic feet per day (mscf/d) of natural gas and 720,000 barrels per day (b/d) of condensates, increasing the number of operating wells in Nooros field to 13 wells. The new well's output boosted the field's production to 1.15 billion cubic feet per day (bcf/d) of natural gas, which is the highest rate in the history of Nile Delta. These data were included in the report submitted by Atef Hassan, Head of Belayim Petroleum Company (Petrobel), for the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla.

IMF Delegation to Visit Egypt for Periodic Review

An International Monetary Fund (IMF) delegation will visit Egypt in May 2018 to conduct the periodic review of the country's economic reform program. The review will assess the implementation of reforms necessary to unlock the third tranche of the $12 billion IMF loan, worth $2 billion. The Egyptian economy continues to perform strongly as the economic reforms start to increase confidence and stabilize macroeconomic indicators. In January, the IMF's report on Egypt recommended eliminating most of the fuel subsidies, Egypt Oil & Gas reported. The fund said that gas subsidies mainly benefit the rich, and advised the Egyptian government to allow fuel prices to change in line with costs.



Egyptian Minister Discusses Investment Opportunities with Snam

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, met with Italian Snam Company's CEO, Marco Alvera, to discuss the opportunities and areas of cooperation during the coming period. The meeting comes in light of the growth of oil and gas activities in Egypt and the implementation of an integrated program to transform Egypt into an oil and gas regional trading hub. Snam is specialized in the implementation and integrated management of natural gas infrastructure in Italy and in the European continent, El Molla stated, adding that the company can play a role in Egypt's regional hub strategy due to its experience in this field.

COOP, Kafr El-Sheikh Sign Petrol Stations Agreement

Petroleum Cooperative Society Company (COOP) will invest EGP 50 million in the construction of seven new petrol stations after they concluded an agreement with Kafr El-Sheikh governorate. The protocol was signed by governor of Kafr El-Sheikh, al-Sayed Nasr, and COOP Head, Samir Rizk, in the attendance of Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, who stated that the ministry is delivering several projects in order to develop services in governorates and meet local demand. The deal comes in light of the utilization of state-owned assets and resources in accordance with Egypt's Vision 2030, the government's long-term strategy for sustainable development.

Ministers Lay Foundation Stone for Two Projects in Damietta

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, along with the Minister of Transport, Hisham Arafat, laid the foundation stones for two projects in Damietta Port. One of the projects is for methanol derivatives and belongs to the Suez Company for Methanol Derivatives. The other project is for the marine berth for the export of urea and ammonia liquid fertilizer project, which belongs to Misr Fertilizers Production Company (MOPCO). The two projects are an achievement of the state's policy to diversify and increase investments as well as to implement the strategy of the petroleum sector to maximize the utilization of natural resources, El Molla pointed out.

PAS Predicts 10-15% Business Growth

Petroleum Air Services (PAS) is expected to increase its business volume by 10-15% in 2018 as a result of the expansion of exploration and production (E&P) activities in the Eastern Mediterranean. PAS Head Yehia Hussein revealed the company's estimations during the general assembly chaired by Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the company's work in 2017. The aviation company supplied air transport services to the oil and gas sector through a fleet of 46 helicopters and fixed-wing aircrafts in 2017.

EMC to Renew Contract for LNG Factory in Angola

The Egyptian Maintenance Company (EMC) successfully sealed a contract for providing operational support for a liquefied natural gas (LNG) factory in Angola for the fifth consecutive year in 2017. Head of EMC Wageeh El Geishy also revealed that the company is currently in discussions to renew the contract for 2019. The company won a contract for the delivery of water injection lines for five wells and for the maintenance of eight natural gas turbines, as well as the maintenance and repair of various capacity tanks and the technical support and construction work for the new production plant implemented by Korea's Samsung Eni in the Zubair area.

Zohr Mechanical, Electrical Installation Close to Completion

The mechanical and electrical installation works for Zohr field's first and second phases will soon be completed. Head of Belayim Petroleum Company (Petrobel) Atef Hassan announced the news during a meeting chaired by the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, adding that pre-operation tests had begun. The meeting was held to review the time frame for completing the field's development and the anticipated production increase. The heads of Petrobel, Engineering for the Petroleum & Process Industries (Enppi), the Petroleum Projects & Technical Consultations Company (Petrojet), and Petroleum Marine Services (PMS) were also in attendance.

Electricity Generation, Consumption Slightly Increase Y.o.Y

Egypt's electricity generation increased by around 0.67% Year-on-Year (Y.o.Y) to reach 15 kWh in January 2018, compared to 14.9 kWh in January 2017. Figures published by the Central Agency for Public Mobilization and Statistics (CAPMAS) show that the country's electricity consumption rose by around 0.84% Y.o.Y to 12 kWh in January 2018, up from 11.9 kWh in the same month of the preceding year. Households made up the largest electricity consumer sector in Egypt, using 41.7% of the country's total consumption, as they used 5 kWh in January 2018. The second largest consumer was the industrial sector with 30% of total consumption, and 3 kWh of electricity consumed in January 2018.

Rockhopper Declares Situation in Egypt to be Improving

Rockhopper Exploration Plc announced that production levels from its Egyptian asset improved as oil prices rose. Net output from Rockhopper's Abu Sennan concession has been standing at 880 barrels per day (b/d) of oil, since the end of 2017. The company has obtained a joint venture approval to drill one exploration well in Prospect S and two development wells as well as one water injection program for the Al Jahraa field, Abu Sennan concession. Following the joint venture approval, Rockhopper is expected to spud its commitment well Raya-1X in the second quarter of 2018, targeting the Nukhul Formation reservoir.

Saudi Aramco to Supply Egypt with Crude for 6 Months

Saudi Aramco agreed to supply Egyptian refiners with crude oil for six months, starting January 2018, Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources, stated. According to the agreement, Saudi Aramco will provide 500,000 barrels of crude oil to Egyptian refineries on a monthly basis, El Molla pointed out. In November 2017, negotiations between Egypt and Saudi Aramco were ongoing for the refining of Saudi crude oil in Egypt, Reuters previously reported. Egypt's refineries were only capable of meeting 65% of Egypt's demand for refined products, but the government had been taking steps to increase Egypt's domestic refining capacity.

IFIC Increases Stakes in a North Sinai Field

Egypt Kuwait Holding Company's subsidiary, the International Financial Investments Company (IFIC), has increased its stake in NSCO Investments Limited Company, which owns the concession rights of the natural gas field located in the North Sinai offshore region. The company boosted its stakes from 40% to 99.997% through the subscription of a capital increase by $20 million. IFIC has recently completed drilling two digital wells, well number 4 and well number 5, in the Tao field, and the wells' initial production indicators show good results. The company is considering drilling four new wells in Kamose field, and well number 10 in Tao field during 2018.

UOP, Grace to Provide Propylene, Polypropylene Factories' Licenses

Sidi Kerir Petrochemicals Company (Sidpec) has evaluated the six offers submitted to obtain licenses for establishing propylene and polypropylene factories as part of its new expansion project. The company aims to obtain the necessary licenses for the factories from licensed international companies. Sidpec chose UOP International for the propylene factory license and Grace International Company to provide the polypropylene factory license. A report submitted by Saad Helal, head of Egyptian Petrochemical Holding Company (ECHEM), to Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, said that the procedures for contracting and obtaining licenses from these companies are ongoing.

Fajr Egypt to Establish Pipeline in Jordan

Fajr Egypt Company has started construction on a 55 kilometer natural gas pipeline in Jordan. Head of Fajr Egypt Ahmed Mahmoud said that the pipeline will enable the transportation of natural gas from northern Jordan to Jordanian power stations from 2020. Mahmoud's statement came during the general assembly, chaired by Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the state-owned company's work during 2017. Fajr Egypt is currently conducting operational and financial studies into the supply of natural gas to industrial, commercial and residential units as well as compressed gas filling stations in Aqaba, Mahmoud stated.

PMS Signs 35 Contracts Worth $276 M in 2017

Petroleum Marine Services (PMS) signed 35 contracts worth $276 million, reaching its highest contracting rate since the day of its establishment, said Al Sayed Al Badawy, Head of PMS. The company installed four marine platforms weighing 9,193 tons, and drilled the largest below water trench in the Middle East reaching 782-meter length and 35-meter width, in 2017, said Al Badawy during the general assembly chaired by the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the company's results for 2017. PMS extended seven marine pipelines reaching 119 km, Al Badawy said.

Dana Gas Sells 157,200 barrels of Egyptian Condensates

Dana Gas Company has announced making $10.4 million during February 2018 after selling 157,200 barrels of condensates from Egypt's El Wastani Field. The company sold a barrel of condensates at an average of $66.5. "The sale marks the fourth cargo of Egyptian condensate since the start of 2017. Last year, the Company sold three shipments for a total receipt of approximately US$21 million," the company mentioned. "The shipments are part of the Gas Production Enhancement Agreement signed with the Egyptian government as a mechanism to help pay down the overdue receivables," it further stated.

Eni Sells 10% of Shorouk Concession

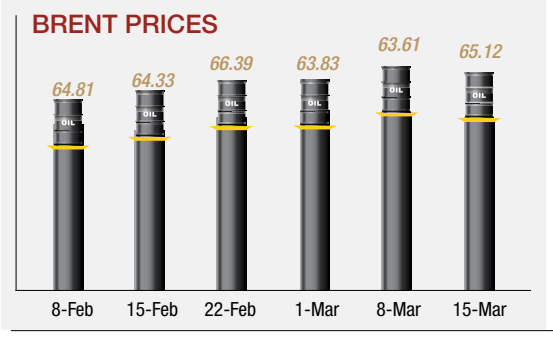
Italian oil and gas company Eni has agreed to sell 10% of its stakes in Egypt's Shourouk offshore concession to UAE's Mubadala Petroleum. Eni's owns 60% stakes at Shorouk concession, which includes the giant Zohr natural gas fied, located in the Mediterranean Sea. The $934 million transaction comes as a part of Eni's dual exploration strategy, under which the company sells stakes in fields it operates as a way to raise cash to finance future development and to support dividends. "We are pleased to be working with Mubadala and welcome them into the partnership for the Shorouk concession," the company's CEO, Claudio Descalzi, said.

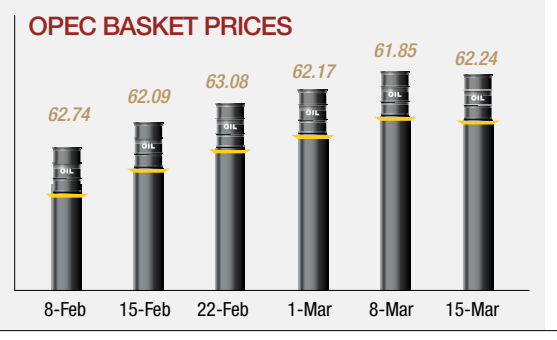
Eni to Increase Zohr Natural Gas Production

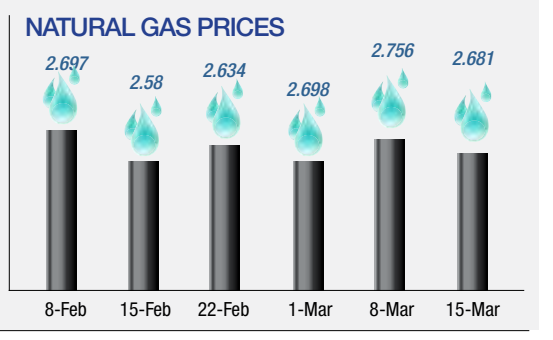
Italy's Eni will increase natural gas production from Egypt's Zohr field by 1.4-1.5 billion cubic feet per day (bcf/d) by the end of 2018. The field's current production is around 400 million standard cubic feet per day (mscf/d) since the completion of the processing plant, an official at the Egyptian Natural Gas Holding Company stated. Egypt aims to increase production of its Zohr natural gas offshore Mediterranean field to reach 700 mscf/d in May 2018, Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources, stated.

SDX Energy Announces New Egyptian Oil Discovery

SDX Energy Corporation has announced making a new oil discovery at the Rabul 5 well. The well is located in Egypt's West Gharib concession in which SDX has a 50% work interest and joint operation. The Rabul 5 well was drilled to a depth of 5,280 feet. The well had around 151 feet of net heavy oil pay at the Bakr and Yusr formations, and has an 18% average porosity. The company is currently evaluating the new discovery after which it expects the well to be finalized a producer and to be connected to the central processing facilities at Meseda.







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SAUDI ARABIA

The Kingdom of Saudi Arabia's (KSA) crude exports will remain below 7 million barrels per day (mb/d) and crude production will stay under 10 mb/d during April 2018. The decision comes as part of KSA's strategy to lower global production and increase oil prices despite of nominations for KSA to produce 100,000 barrel per day (b/d) more.

Construction began on the Saudi Aramco joint venture shipyard on KSA's eastern coast following the agreement for a loan from the Saudi Industrial Development Fund (SIDF). **The project will cost Aramco more than $5.3 billion and will be led by one of the Saudi company's executives.** The facility is planned to cover an area of nearly 12 million square-meters and have an annual capacity to manufacture four offshore rigs and over 40 vessels, including three Very Large Crude Carriers (VLCCs), and service over 260 maritime products.

American imports of Saudi crude oil dropped to 943 b/d in 2017, a 14% decrease from 2016, according to US government statistics. This is the lowest annual amount of crude exported by KSA to the US since 1988. Saudi Arabia exported just 690,000 b/d of crude to the US in December 2017, a 32% year-on-year drop. **In contrast, Iraqi shipments to the US surpassed those from Saudi Arabia for the first time since 1985.**

Data released by the Joint Organizations Data Initiative (JODI) revealed that **Saudi shipments of refined fuels rose 27%, while crude exports remained in-line with the OPEC-sanctioned cap.** The kingdom's **sales of gasoline rose by 51% to 328,000 b/d amid sliding domestic demand, diesel exports increased by 13% to 803,000 b/d**.

UAE

Abu Dhabi National Oil Company (ADNOC) will offer new oil and gas blocks for bidding to help the country hit new untapped resources. The Emirati firm will host the Downstream Investment Forum in Abu Dhabi on May 13th and 14th, during which the company will publicize significant co-investment opportunities aiming to grow and strengthen its downstream portfolio.

ADNOC granted several IOCs stakes in Abu Dhabi's Umm Shaif and Lower Zakum offshore fields during March. China National Petroleum Corporation (CNCP) bought two 10% stakes in a 40-year agreement that is worth $1.18 billion. The concessions will be operated by PetroChina, which is majority-owned by the state-backed CNCP. **Eni was also awarded a 10% share in the Nasr and Umm Shaif oil field and 5% stake in the Lower Zakum deposit in a $875 million 40-year deal. French Total SA won 20% of the Umm Shaif and Nasr concession and 5% of the Lower Zakum concession, together worth approximately $1.4 billion.** Total is also considering investing more in downstream projects in the UAE.

Lower Zakum will have a production rate of 450,000 barrels per day (b/d), while Umm Shaif will produce 460,000 b/d on top of 500 million standard cubic feet per day (mscf/d) of natural gas. **ADNOC will retain a 60% stake across the various split concessions, with the remainder being divided up between the partners.**

ADNOC aims to increase its oil production capacity from 3.2 mb/d to 3.5 mb/d by the end of 2018.

QATAR

Qatar Petroleum has awarded the front-end engineering and design contract for its North Field Expansion to Japanese Chiyoda Corporation. **The facilities will produce an additional 23 million tons per year (mt/y) of LNG, raising Qatar's annual production from 77 mt/y to 100 mt/y.** The North Field will send approximately 4.6 billion standard cubic feet per day (bscf/d) of feed gas to the onshore facilities. The processing of the feed gas will produce approximately 3,000 tons per day of ethane, 185,000 barrels per day (b/d) of condensate, 8,500 tons per day of LNG for world market export, as well as 12 tons per day of pure helium.

BAHRAIN

Bahrain LNG (BLNG) started construction on a LNG receiving terminal, a regasification unit, and a 5-kilometer undersea pipeline. The project is estimated to cost around $670 million. The project is part of numerous current and upcoming oil and gas projects conducted by BLNG worth a total of $6 billion.

IRAQ

Total is considering bidding to build the green-field oil refinery in the Iraqi city of Nassiriya as part of a broader plan to develop the Nassiriya field's infrastructure. Two inside sources revealed the company's plans to bid for the refinery, which is projected to have a capacity of 150,000 b/d. IOCs can still bid only as refiners, while Dhi Qar is now solely responsible for the development of the oil field.

The Iraqi parliament voted on March 5th to create a national oil company to handle the country's energy sector. The new national firm is set to act as an umbrella organization for the state-owned Iraq National Oil Company (INOC).

Iraqi plans to decrease imports of petroleum products by 25% as the country's crude refineries are being rehabilitated after the conflict with Islamic State militants.

Iraq exported around 96 million barrels of oil in February 2018, generating revenues of $5.726 billion, the oil ministry has announced. The figures are lower than those recorded over the previous three months. The figures refer to oil exported from the Basra terminal only while activity remains at a standstill in the northern province of Kirkuk after Iraqi forces retook Kurdish territory following the independence referendum in September 2017.

Pearl Petroleum has signed a 10-year gas sales agreement with the Kurdistan Regional Government (KRG). The agreement will see the consortium led by Dana Gas and Crescent Petroleum sell an estimated 80 million cubic feet per day (mcf/d) of additional gas to the KRG from the Khor Mor field, whose current production is 305 mcf/d.

Shell has agreed to sell its 19.6% stake in the West Qurna1 oil field in southern Iraq to a subsidiary of Itochu Corporation for $406 million. The purchaser will assume debt of $144 million as a part of the transaction.

IRAN

Studies conducted by foreign and domestic firms on Iranian oil fields announced that **Iran has the ability to increase its proven oil reserves by 10%**.

Iran is keeping its current crude oil output during the next fiscal year, which starts on March 21, 2018. Daily production capacity is about 4 mb/d; however, the actual output is closer to 3.9 mb/d. Excluding condensates, Iran's average daily output is 1.7 million barrels.

Iran has nearly doubled gas output at the South Pars gas field during the past Iranian calendar year. Gas production increased from 285 million cubic meters (mcm) to 555 mcm. Accordingly, the Persian country is planning not to import gas during the next Iranian calendar year.

NIOC signed an Iranian Petroleum Contract (IPC) worth $740 million with a Russian-Iranian consortium, including Russian state-controlled Zarubezhneft Oil Co., and the private Iranian Data Energy Co., **to develop two oil fields near the Iraqi border.** The agreement stipulates that 105 million barrels of crude oil will be produced over a 10-year period from the two fields.

NIOC signed an agreement whose CAPEX is $2.426 billion with Pasargad Energy Development Company (PEDC) for the integrated development of Sepehr and Jofeir Fields, located 60 kilometers southwest of the oil-rich city of Ahvaz. **The deal aims to produce a maximum of 110,000 b/d with a total output of 512 million barrels from the two fields after 20 years.** The indirect costs of the project are estimated at $412 million.

MOROCCO

SDX Energy Corporation announced a new natural gas discovery in its SAH-2 well, located on the Sebou permit in Morocco. Around 5.2 meters of net conventional natural gas pay were encountered across two zones in the Hoot and Guebbas formations, and the recorded average porosity in the pay section was 33%. SAH-2 well is set to be completed, tested, and connected to the country's existing infrastructure, and the company will announce further updates on testing results during April 2018.

OMAN

Petroleum Development Oman (PDO) announced a new gas find with estimated recoverable reserves of more than 4 trillion cubic feet and 112 million barrels of condensate at two reservoirs named Barik and Miqrat in the northern part of their concession area. The commercial flow rates at the reservoirs tested at 1.2 mcm/d after fracturing.

Galfar Engineering & Contracting Company signed a contract worth approximately $95 million with BP in Oman for the construction and installation of a gas gathering system.

EAST MEDITERRANEAN
Cooperation, an Interview with
CHARIS MORITSIS
CYPRIOT AMBASSADOR TO CAIRO

By: Omnia Farrag

Cyprus is exerting strenuous efforts to boost oil and gas activities in its Mediterranean waters. Besides the discovery of the Calypso gas field by Italy's Eni and France's Total in the Cypriot Exclusive Economic Zone (EZZ), few kilometers away from Egypt's Zohr, the East Mediterranean State is in the process for signing an agreement with Egypt to transfer its natural gas. However, the Cypriot efforts are faced with resistance from its neighbor, Turkey, as it is the only State worldwide not to recognize the Cypriot EEZ. Instead, Turkey is the only State that recognizes the "Turkish Republic of Northern Cyprus". The controversial activities of Turkey in the Exclusive Economic Zone of Cyprus took place last month, when the Turkish Navy blocked the access of a drillship.

In order to discuss recent updates on the tension between Cyprus and Turkey in the Mediterranean, Egypt Oil & Gas had the chance to talk to the Cypriot Ambassador to Cairo, Charis Moritsis, who further commented on the country's plans for hydrocarbon offshore exploration, as well as the cooperation between Egypt and Cyprus in the energy sector.

What are the main reasons behind Cyprus' exploration activities in the Mediterranean?

The aim of Cyprus is to explore all the possibilities that are included in its rights in the East Mediterranean and its Exclusive Economic Zone (EEZ), so it can fulfill all legal obligations and rights that are driven by the Law of the Sea. We have relevant agreements with our neighbors in the region and I have to stress the importance of the demarcation agreement with Egypt, for both countries. This demarcation agreement and its importance were well explained by our leaders. The prospect of transfer of natural gas to Egypt from Aphrodite block 12, it would be beneficial for both countries and the European Union. We are very optimistic that very soon we will finalize all the details regarding the pending agreement. This agreement would give us the chance to prove the wealth beneath our seas and it shows the cooperation that can be developed in the region. This is an example that and others can follow.

Turkey has been resistant to the Cypriot petroleum activities in the Mediterranean and recently started to act against them. What is your comment on that?

There is not a territorial disagreement between Turkey and Cyprus. It [Turkey's actions] is a violation of international law. Our activities regarding natural gas and its exploration are based on International Law. Our agreement for the demarcation with Egypt has been deposited to the United Nations. It is there, we have followed the international law pattern for our agreement, and we are working with our partners for the implementation of our cause, which is the exploration of natural gas for the benefit of our peoples and for the benefit and stability of our region.

Accordingly, Turkey's actions are not against Cyprus, but against the International Law, the regional cooperation, the energy security of the European Union (EU), and the rights and prospects of the private partners of Cyprus in the region. Big companies interested in investing in the region found themselves in a very unpleasant situation when they had to reschedule some their plans because the

Turkish navy was blocking and intercepting their ships and not allowing them to proceed with their activities.

It is highly important to take note and to quote the last EU's European Council Conclusions regarding the Turkey's aggression in the Eastern Mediterranean and Cyprus "The European Council strongly condemns Turkey's continued illegal actions in the Eastern Mediterranean and the Aegean Sea and underlines its full solidarity with Cyprus and Greece… In this context, it recalls Turkey's obligation to respect International Law and good neighborly relations, and normalize relations with all EU Member States including the Republic of Cyprus…", dated 22 March 2018.

What is your comment on Turkey's latest move of stopping the Saipem 12000 vessel?

First of all, Turkey violated international law by issuing a "navigational warning" itself, because the only Authority that is eligible to issue navigational warning in this area is the Republic of Cyprus, not Turkey. Before their illegal navigational warning, we [the Republic of Cyprus] had issued one, securing this area for Saipem 12000, and then Turkey interfered with an illegal one and all the illegal acts that were followed against the vessel. Turkey once more resorted to threats in order to advance its own interests under the pretext of "concerns" over the rights of Turkish Cypriots.

What are Cyprus' alternative plans to strengthen its position in spite of Turkey's recent moves?

Few weeks before the provocation of Turkey, we had the discovery in Cyprus' Calypso Block, and Turkey then did not react. This is just to remind us that we should continue our exploration program with the ways and efforts that we know. We know how to fulfill our goals tirelessly and to maintain our rights, and we will continue doing so properly, orderly, and timely. The government of Cyprus has consistently acted with restraint, on the one hand continuing to exercise its sovereign rights to explore and exploit its natural resources, while on the other hand acting responsibly, and as a reliable actor in the Eastern Mediterranean exerting every effort to avoid friction.

> The prospect of transfer of natural gas to Egypt from Aphrodite block 12, it would be beneficial for both countries and the European Union.

What is Cyprus plan to ease this tension?

We are focusing on our program. Turkey is the one that has to operate in a reverse direction from what it is doing until now regarding this issue. It has to decide whether it will continue provocations or not. The Republic of Cyprus will resolutely continue its policy in the field of hydrocarbons, in full respect of International and EU Law. The President of the Republic of Cyprus has taken a clear position affirming that the Turkish Cypriots will benefit from the exploitation of hydrocarbons in the context of an agreed settlement of the Cyprus problem. In the bi-communal negotiations, it was agreed that natural resources will fall within the competences of the federal government. It has to be underlined that a convergence was reached by the two Communities of Cyprus, for the exploitation of Cyprus' natural resources, and Turkey is using excuses to intervene in order to block the prospect of the growing regional cooperation.

Can you tell us more about your plans to ensure that your programs will be implemented?

The planning to ensure the timeframe for the implementation of the exploration program of the Republic of Cyprus is based on prudent acknowledgement of the technical procedure and the delays or accelerations that could occur in the course of the exploration program. Moreover, we are aware of the necessity to follow the market balances and cooperate with the willing neighbors for the advancement of the region into an alternative route and source of energy.

What are Cyprus' short-term exploration plans in the Mediterranean?

One very important step is to see the natural gas from Cyprus' Block 12 coming to Egypt for liquefaction. The exploration plan of the Republic of Cyprus will continue as agreed and planned with our international partners.

What challenges do you expect to face?

The biggest challenge is the hidden quantity of gas. Our challenge is to find big reserves, and the obstacle is the hard rock that we have to drill. We are doing what we have to do in order to make sure that the negative interference will be eliminated. We had examples in the past, for exploration and for drillings without any interference and we will continue in this manner.

Do you expect ExxonMobil's coming operations in block 10 to face the same Turkish resistance? How would Cyprus respond to this?

ExxonMobil is on its way to explore all possibilities in block 10. We have its ships present in our sea nowadays. These ships will identify the targets for ExxonMobil. We do not need to question all these issues. These are licensed blocks and the companies are fulfilling their obligations according to the contracts that they have signed with the Republic of Cyprus, so we are proceeding following the agreed plan.

> The exploration plan of the Republic of Cyprus will continue as agreed and planned with our international partners.

Are there any short-term plans for Egyptian-Cypriot joint investment in the Mediterranean?

The important thing is to finalize the agreement in order to have the pipelines transferring natural gas from Block 12 to Egypt. The cooperation between the two countries and the regional cooperation is developing with those actors who are willing to cooperate. Let's have the people find their way to sit around the table and start discussing the possibilities and the options for the regional stability and cooperation. When Since we manage to gather ourselves around the table willing to cooperate, then the prospects can are be very promising and the only obstacles are the physical ones, not the imaginary, or political, or ideological.

Moreover, I would like to mention the EuroAfrica interconnector a promising project that foresees the connection of the electrical grids of Egypt, Cyprus, and Greece for the transmission of electricity. The project is welcomed and fostered by the three governments. We are in the process of finalizing the feasibility study for the application of the cable and this is another element of cooperation between Cyprus and Egypt in the energy sector. We are hoping for the best and soon we will have new announcements regarding this. This project could be addressed from another angle, that of the further enhancement of the relations between Egypt and the EU, since this project can help resolve the issue of energy isolation of the Eastern Mediterranean parts of the EU.

Is there any available information regarding the time frame of the EuroAfrica interconnector?

The initial point of this project goes back in February 2017, and since then we have held a series of meetings and actions fulfilling the ultimate goal. We had another landmark this January 2018 here in Egypt and another series of meetings in order to finalize some elements, and we are expecting soon, during this year, to have something tangible for announcement.

MARIA HANSSEN: DEA TO INVEST $500 MILLION IN EGYPT

By Mariana Somensi

DEA Deutsche Erdoel AG, an international operator in the field of exploration and production of crude oil and natural gas based in Hamburg, Germany, has recently witnessed significant increase in oil and gas production from its Egyptian fields in the Gulf of Suez and the Nile Delta.

The company has been active in Egypt since 1974 and has produced over 650 million barrels of crude oil in the Gulf of Suez during the last 30 years. In 2013, DEA started natural gas production from the Disouq field in the onshore Nile Delta. The company is further a partner in the West Nile Delta project, which corresponds to one of the largest projects in DEA's portfolio.

Egypt Oil & Gas had the opportunity to join Maria Moraeus Hanssen, DEA's CEO, at an exclusive press conference in Cairo and discuss the company's achievements and prospects in Egypt, as well Hanssen's insights on the future of the Egyptian oil and gas sector.

New Investments

In order to enhance DEA's presence in the country, Hanssen announced the company's commitment to invest $500 million in its facilities in Egypt. According to her, this amount will be injected across the company's portfolio through the next three years, starting from 2018. "In our portfolio in Egypt, we have many resources that can still be developed; with a stronger balance sheet and more capacity, we would invest more in our current fields," she stated.

The biggest part of this investment would be directed to the West Nile Delta project. However, DEA has further started a reinvestment program in its Disouq field to boost production from its facilities. "We have additionally negotiated new terms for the Gulf of Suez concessions in order to invest more in our existing assets," she added. Commenting on these new terms, Hanssen disclosed that the agreements are still subject to parliamentary approval.

West Nile Delta

The West Nile Delta project, located in Egypt's Mediterranean waters, represents a milestone to DEA and the Egyptian petroleum industry. Successfully delivered eight months ahead of scheduled start-up, natural gas production started in March 2017 from two of the project's five fields, namely Taurus and Libra. Once the five fields come online, the project will add 250 million cubic feet per day (mcf/d) of natural gas to the company's production in Egypt.

The project's operator, BP, holds a 82.75% share, while DEA holds the remaining 17,25%. When asked if DEA intends to increase its shares in the West Nile Delta, Hanssen disclosed that the company do not expect BP to sell its shares. However, the company's CEO stressed that, given the magnitude of the West Nile Delta project, DEA's 17.25% share stills corresponds to the company's largest investment across its portfolio. "If we look at DEA's total portfolio in Norway, Germany, and Mexico, this investment that we have with BP is by far the largest we have in our portfolio now," she stated.

Natural Gas Market

Amidst Egypt's ongoing efforts to modernize the petroleum sector, Hanssen declared that, as an independent oil and gas company, DEA sees Egypt's attempts to liberalize the oil and gas market as encouraging. "It is easier for the company to be in a country where markets are liberalized and where the sale and off take of oil and gas are driven by the market and not completely dominated by the state… Should Egypt and the Egyptian authorities agree on the liberalization of the oil and gas market and more standardized export conditions, I think we can hardly see any disadvantage to Egypt in our portfolio."

For DEA, the Arab republic ranks favorably in terms of concession systems due to the abundance of oil and gas resources. Given Egypt's boom in natural gas production and prospects of being back to the gas exporting map, Hanssen affirmed that, whether the company will export its Egyptian supplies or not, the decision would depend on the country's exporting conditions. "I believe there is a reason to think that Egypt may actually end up exporting gas in couple of years and I cannot rule out that we would be part of this export. We see the interest and the opportunities for Egypt to become a natural gas hub for the Mediterranean region and we will be very willing to be part of that."

Merging Plans

Commenting on DEA's ongoing discussions on the merger with Wintershall, Hanssen clarified that the company's shareholders have agreed with shareholders of Wintershall that they should seek to sign a merger agreement. "We are still in a non-commitment phase… What has been agreed between the two parties is that, in this merging, DEA represents one third of the value and Wintershall represents two thirds."

She further explained that, from an Egyptian perspective, the merger would be very interesting. "We will take more commitments, more investments, and do more in Egypt than what we have been able to do in the last couple of years."

"Even when this merger goes through, the plan is to IPO the company, to go to the stock market. This will represent big changes for DEA and our company's structure. Last time I was in Egypt, we had the opportunity to sit with the Minister of Petroleum, and his excellence was very happy about this." As she explained, for the national authorities, having larger contributor shareholders for the oil and gas sector is extremely positive.

Egypt as an Energy Hub

The press conference was concluded with Maria Hanssen expressing her beliefs that Egypt will succeed with its plan of becoming a regional energy hub. "Egypt is a big market for gas and has the potential for using more gas in industrial production. This big domestic market and exporting facilities obviously should favor Egypt. With our portfolio in Egypt today, we will favor such opportunity."

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GAINS AND RISKS:

BEYOND THE EGYPT-ISRAEL NATURAL GAS DEAL

By Menan Khater

The landscape of East Mediterranean natural gas collaboration took an unprecedented turn in February 2018 after Egypt's Dolphinus Holdings, US-based Noble Energy Inc., and Israel-based Delek Drilling-LP announced a $15 billion gas deal. The deal, which allows Dolphinus to import 64 billion cubic meters of gas over a decade from Noble and Delek, is not only a milestone in the Egypt-Israel bilateral relations, but also a stepping-stone for the region's natural gas production.

The Eastern Mediterranean is the site of a huge reservoir of natural gas upwards of 1.89 trillion cubic meters of gas; consisting of Israel's Tamar and Leviathan fields, Cyprus' Aphrodite, and Egypt's recent discovery of Zohr. The deal was not an afterthought and it will prove mutually beneficial for all countries involved. The extra revenues will help the Israeli consortium develop the Leviathan field, and Egypt's position will be enhanced as a regional hub for natural gas exports.

However, some aspects of the deal need to be investigated more closely, as what route would be the best for transferring the gas between the two countries and how much it would cost, as well as the associated security concerns. Moreover, it remains unclear whether Egypt will use some of this gas for domestic use or not, and whether it will help drop a $1.76 billion fine against Egypt in international arbitration by East Mediterranean Gas (EMG).

Delivery Method

Egypt and Israel have long shared a pipeline from Arish to Ashkelon, through which the former exported natural gas to the latter under a 20-year agreement. When the 2011 uprising took place in Egypt, the exports were halted indefinitely as the country experienced political turbulence.

After a number of attacks on the pipeline by militants in the restive Sinai Peninsula, Israel Electric Corporation (IEC) took the case to international arbitrators. In December 2015, the arbitrators imposed a $1.76 billion fine on Egypt in compensation to Israel, excluding interest and legal expenses.

"The best route is always the one that is the most stable. Which is not necessarily the shortest or cheapest," Brenda Shaffer, adjunct professor at Georgetown University's Center of Eurasian, Russian and East European Studies (CERES), told Egypt Oil & Gas.

Shaffer, who has previously advised the Israeli government on energy policy, believes that "supply disruptions are very costly, so it is wise to look for the most stable route and commercial entity… I assume involvement of international oil companies in the deal would add stability to a supply contract between Israeli and Egyptian entities," she stated.

"There are still challenges regarding the route. It seems that Delek is in the process of acquiring EMG [the former operator of Arish-Ashkelon pipeline], so it can offer a compromise related to the arbitration judgment and thus, pave the way to realizing the supply deal to Egypt," Shaffer added.

The Tamar field in Israel began production in 2013 and its exports will be used for the deal. However, the delivery method is still unclear as the field is not adjacent to Ashkelon.

"The old pipeline extends from Ashkelon, Southern Israel, while Tamar is located in Northern Israel. There is no other way but creating a new pipeline from the field in Israel to the plants in Damietta and Rosetta," energy

expert Ibrahim Zahran told Egypt Oil & Gas.

In terms of duration, the pipeline construction could take a few months, but its cost will be an extra burden for Egypt, according to Zahran. "It would be more viable if Israel brings the natural gas to Egypt at its own expense, and use the liquefaction stations, rather than burdening Egypt with import bills," Zahran said.

In January, Jordan announced that it was allocating $2.1 million for a natural gas pipeline linking the Hashemite Kingdom with Israel, according to Ammon News. This follows an agreement made in September 2016 between Jordan's National Electric Power Company (NEPCO) and Noble Energy in Israel to import 40% of the Kingdom's electricity-generating needs from Israel. This is considered another potential path for the delivery of gas between Egypt and Israel under the new deal.

"The delivery method could be through the Jordanian-Israeli pipeline, because of the easy way and reduced cost to transfer the gas via pipe that is there already," Tharwat Hassane, Professor of Petroleum Engineering at the British University in Egypt (BUE), told Egypt Oil & Gas.

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>
> **Tharwat Hassane, Professor of Petroleum Engineering at the British University in Egypt (BUE)**

Yet, Hassane affirms that "the best way would be through the East Mediterranean Gas Company's pipeline from Arish to Ashkelon currently in place, which is 100 km away from Israel to Egypt."

Potential Benefits

One day after the announcement of the gas deal between Egypt and Israel, Cypriot Minister of Energy, Georgios Lakkotrypis, announced plans to sell natural gas to Egypt. "Cyprus is close to selling natural gas to Egypt's liquefied natural gas plants, and we could reach an agreement in the coming weeks," Lakkotrypis said in a telephone interview from Nicosia.

The announcement heralds a new phase for Egypt's position on the global energy map. Egypt's Ministry of Petroleum and Mineral Resources Spokesperson, Hamdy Abdelaziz, said that "the agreement made between the Egyptian firm to import natural gas from Israel is part of the country's strategy to turn into a regional hub for energy," noting that a similar agreement is underway with Cyprus. "Receiving the Israeli gas is also one of the proposed solutions to reach a reconciliation over the international arbitration between companies," Abdelaziz noted.

In that case, Egypt is required to stick to transferring the gas through the old pipeline between Arish and Ashkelon. "Using the EMG pipeline will simply close the international lawsuits against Egypt," Tamer Abu Bakr, President of the Petroleum Chamber and Chairman of the Energy Committee of the Federation of Industries, told Masrawy.

But whether Egypt uses the EMG pipeline or not, "in Israel, however, officials deny that there has been any agreement on compensation," Haaretz reported. The Israeli newspaper quoted the minister of energy as saying: "Israel hasn't given up on the debt and the matter did not come up for discussion during talks on the Leviathan export deal to Egypt that was signed [last] week."

Moreover, Haaretz cited an IEC statement denying that any concessions have been made. "The company is not aware of any concessions on the debt. There will not be any backing down on the debt. The company continues to seek to collect it," the statement read.

Nonetheless, the deal could still benefit the Egyptian economy. "Egypt will gain lots of money from the company which will use the infrastructure and the facilities of EGAS and EGPC," Hassane said. "The country will further gain $1.5 billion a year from using the liquefaction plants in both Idku and Damietta," utilizing the fact that it is the only country in the region with such facilities, he added.

The remaining amount of gas will be used for domestic purposes. "The additional amount of gas could be allocated for domestic use or export, certainly in light of recent shortage in natural gas for the industrial sector over the past few years," Abu Bakr mentioned. Echoing his statement, Hassane said that "the extra gas will be used in the petrochemical industry, which gets more benefits from the natural gas."

Regarding the country's transformation into a regional hub, Zahran said that Egypt will still be challenged by bigger key players in the industry. "Compared to Russia and Iran, Egypt still has a long way to go in order to position itself as an export hub," he said. "Even if Zohr natural gas field is expected to cover domestic need, Egypt should instead use the remaining output to support local industrial and agricultural sectors, instead of export," Zahran believes.

In Israel, the exports under the deal will impact the economy, public services and the wider public. The Israeli government should receive around 50% of the revenues, Miki Korner, Private Energy Consultant and Former Chief Economist for Israel's Natural Gas Authority, informed Jerusalem Post. "Operators of Israeli natural gas will be getting around $1 billion to $1.5 billion annually, the state gets to impose a 12.5% royalty on the revenue from natural gas,

while income tax will take some 23% on the profit, and the excess revenue tax will range from 22 to 24%," Korner stated.

Paving the Way

The deal is notable for increasing bilateral relations between Egypt and Israel; however, it would not have gone through had relations not already been close. "The relations are already excellent, especially in the security sphere, and those good relations paved the way to the deal. However, it [the deal] will not have big impact on those relations, except only potentially negatively. If there are commercial disputes, than they can reflect onto the political relations," Shaffer noted. Egypt, on the other hand, attributed the deal to the private sector: "The Egyptian government is not part of the natural gas deal with Israel," President Abdel Fattah El-Sisi said.

"International gas supply deals entailing significant investment that is returned over a decade or more only work when beneficial to both sides," Shaffer noted. "When a gas supply deal only benefits one side, the deals rarely are sustainable."

With the new discoveries of Tamar and Leviathan, Israel has enough gas to provide for its needs even if no new reserves are discovered, while Egypt possesses the infrastructure needed to utilize those reserves. This infrastructure could also be expanded by adding new liquefaction plants, according to Abu Bakr. Meanwhile, proposed scenarios for cost efficiency, delivery methods, and arbitration need to be addressed thoroughly to ensure the deal sustainability.

IMPACTS OF LEBANON'S ROUTE TO OIL AND GAS

By Sarah Samir

Lebanon's first oil and gas offshore licensing round in the Mediterranean is raising concerns among experts over whether it will be compatible or competitive with the similar oil and gas ambitions of neighboring Egypt. On January 26th, 2017, Lebanon announced that blocks 1, 4, 8, 9 and 10 would be open for bidding as part of the first offshore licensing round in the country, aiming at developing the oil and gas sector and benefiting from its resources.

"We are hoping that the discovered gas quantities will be big enough in order to justify the field development and to satisfy the local demand and even to export it," Abboud Zahr, Managing Director at DEP Levant Oil & Gas Company, told Egypt Oil & Gas. "The seismic surveys done until now in the Lebanese Offshore look promising, especially in the two awarded blocks 4 and 9," he added.

According to Minister of Energy and Water, Cesar Abi Khalil, the exploration and production (E&P) in Lebanese offshore fields "is going to create a new sector in the economy, and will secure a local source for energy." At the same time, experts say that Lebanon could benefit from Egypt's experience in offshore drilling and infrastructure, especially after the 2015 discovery of Egypt's mammoth Zohr natural gas field.

Lebanese Reserves

For years, studies have been showing that Lebanon has access for oil and natural gas reserves. "Studies indicated that there is nearly 1.7 billion barrels of technically recoverable oil and 122 trillion cubic feet of technically recoverable gas in the Levant Basin, of which part of each is found in Lebanon," stated a Fransabank study entitled "Is Lebanon Really an Oil and Gas Producing Country?"

Lebanon owns "offshore oil reserves estimated to be anywhere between 440 [million] and 675 [million] barrels, and possibly as much as 96 [trillion] cubic feet (tcf) of offshore natural gas reserves, potentially worth a combined $300-$600 [billion]," according to an article written by Pinsent Mansons' Senior Associate, Niazi Kabalan, under the title of "Lebanon – a new frontier for hydrocarbons."

However, Lebanon "will not know how much gas or oil it actually has before it starts the actual drilling and makes some discoveries. Lebanon will start drilling its first exploratory well in 2019, and it is assumed that it will take between 3-5 years to know whether it actually owns gas or not," Diana Kaissy, Executive Director at the Lebanese Oil and Gas Initiative (LOGI), told Egypt Oil & Gas.

Marine Borders

Lebanon is located on the eastern Mediterranean's Levant Basin. The basin has several huge sub-sea natural gas fields, "including the Leviathan and Tamar fields located in Israeli waters near the disputed marine border with Lebanon," Lisa Barrington and Dan Williams said according to a report published by Reuters.

Yet, "Lebanon implemented its block delineation as per its sovereign boarders. All of its blocks fall within its territorial waters," said Kaissy, adding that Israel is "aiming at chipping off part of the Lebanese territory." However, "Lebanon has taken the issue up with the relevant international bodies, [to the United Nations] (UN)," she noted.

Additionally, UN Spokesman, Stephane Dujarric, told media earlier in 2018 that "the UN is encouraging everybody to use diplomatic means to address these issues… The UN supports the right of both Lebanon and Israel to exploit their maritime resources in accordance with the international law of the sea." Therefore, Lebanon's exploration in the Mediterranean block should not face any political complications.

E&P Agreements

In order to govern E&P process, Lebanon's cabinet issued the decree number 43 on January 4th, 2018, including the Tender Protocol (TP), which is related to offshore licensing rounds and to the Exploration and Production Agreement (EPA).

According to the EPA, "the Right Holders, [which are the companies signing the EPA], must pay royalties to the State, equal to 4% of the gas produced, and a varying percentage between 5% and 12% of the oil produced," stated the Lebanese Petroleum Administration (LPA)'s article on the EPA.

Additionally, "a percentage, determined by bidding, of the oil and gas is allocated to the Right Holders to reimburse their costs. The remaining oil and gas is split between the State and the Right Holders in proportions determined by bidding under a formula pursuant to which the State's share increases after the Right Holders have recovered their investment," the LPA's article explained. Moreover, the companies

> "Lebanon will start drilling its first exploratory well in 2019, and it is assumed that it will take between 3-5 years to know whether it actually owns gas or not."
>
> **DIANA KAISSY,** Executive Director at the Lebanese Oil and Gas Initiative (LOGI)

in the contract are subject to pay Lebanese taxes.

In January 2018, Lebanon signed its first EPA for exploration in the Mediterranean Sea. The contract was awarded to a consortium of companies consisting of Novatek, Eni, and Total for two offshore blocks. The consortium had been given a license for exploration in Block 4 and Block 9 in December 2017, as reported by the media. "The award of the two offshore blocks will have a positive impact on the economy once drilling activities start in 2019," Abboud Zahr commented.

"Lebanon has to learn how to cooperate with the present operator once a gas field is discovered in order to start pumping gas as soon as possible and avoid any unnecessary delay."

ABBOUD ZAHR, Managing Director at DEP Levant Oil & Gas Company

E&P to Economic Boom

Currently, Lebanon experts consider E&P activities as a way to flourish the stumbling economy. "The successful development of Lebanon's gas resources could bring substantial economic benefits to an ailing economy and strengthen the country's energy security," Bassam Fattouh, Director of the Oxford Institute for Energy Studies and Professor at the School of Oriental and African Studies, University of London, told Natural Gas Europe.

At the same time, Lebanon depends on imports to cover its local consumption of fuel. "In 2013, Lebanon's imports of oil and its derivatives amounted to $5.11 billion," according to an article by Lana Fayad and Rayan Kouatly in Kouatly & Associates. Lebanon's fuel consumption has recently reached 55,000 barrels of distillate fuel oil per day, 134,000 barrels of crude oil per day, 5.6 billion cubic feet of dry natural gas per day, and 7,500 barrels of liquefied petroleum gases per day, the article explained. Yet, with a promise of oil and gas production, Lebanon can decrease imports and shift to natural gas as fuel.

Egypt, Lebanon Future Hydrocarbon Relations

The Eastern Mediterranean is a promising place with treasures of oil and natural gas resources, according to experts. With several countries on the Mediterranean, relations are formed, whether these relations are based on competition or cooperation.

"This year, the [Lebanese] government is expected to launch a tender to acquire up to three floating storage and regasification units (FSRUs) to be located in Tripoli, Zahrani, and Salaata," stated Mona Sukkarieh in her article "Lebanon's oil & gas sector - What to expect in 2018." Considering Lebanon's location, if the country implemented import and export gas facilities, it could compete with Egypt on being a gas regional trading hub. However, Diana Kaissy stated that "with Zohr's massive discovery of 30 tcf, it is unlikely as of yet that Lebanon will be competing with Egypt."

Moreover, "Egypt chances to become a regional hub for gas export are very high, as its already existing infrastructure will help much in this regard," Zahr explained. "I do not think Lebanon will compete with Egypt in terms of natural gas production, I see rather a cooperation, as the relations between the two countries are excellent and Egypt would give Lebanon a priority to use its two liquefied natural gas (LNG) plants if needed," he added.

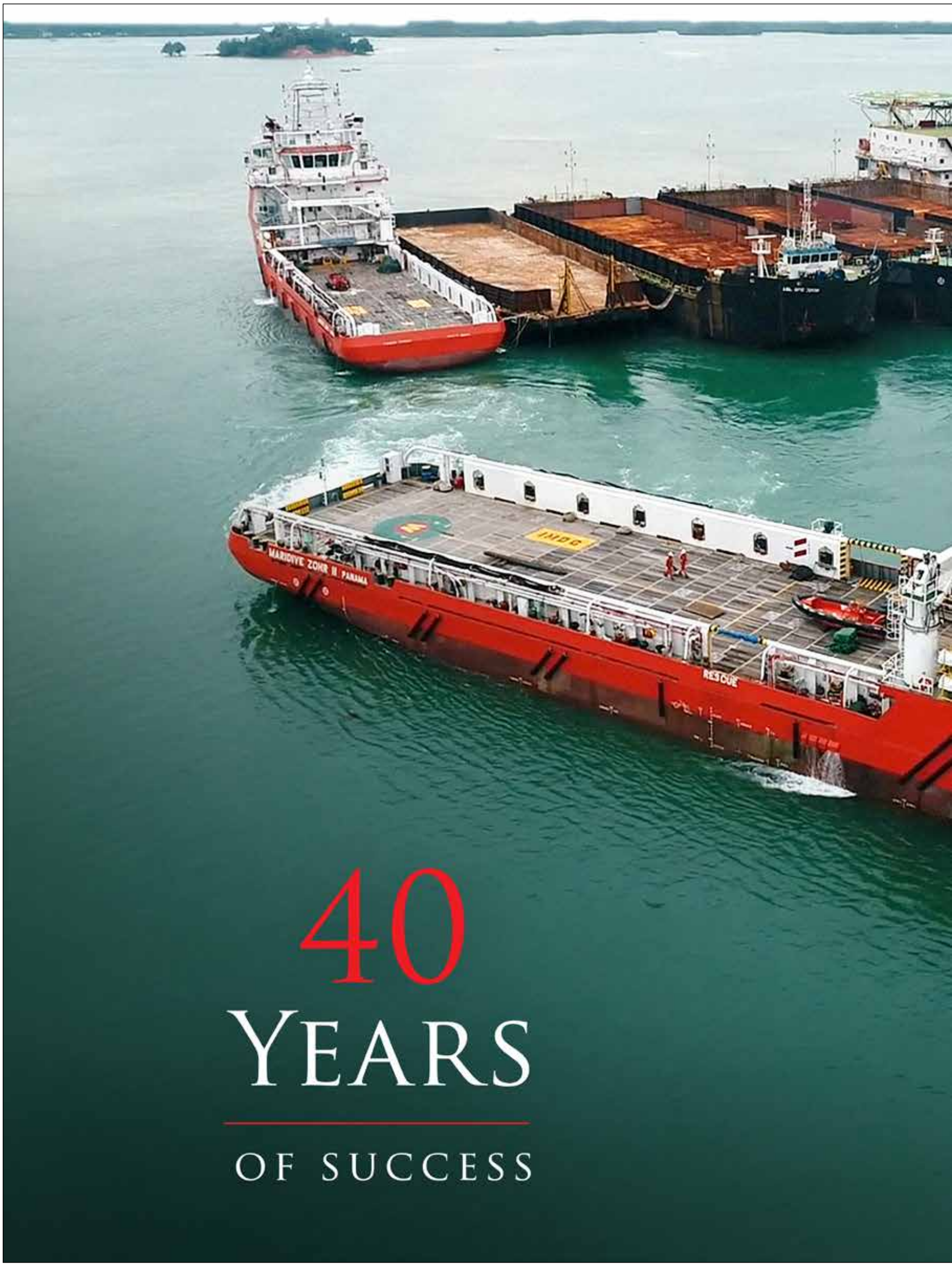
Egypt and Lebanon have a great chance for cooperation in the oil and gas industries, as experts believe. When Lebanon starts production, in case of surplus for exports, the country will have three routes to exports gas, according to Kaissy, through "pipelines extending from Lebanon to Cyprus, Greece, then to Europe; through floating liquefied natural gas (FLNG) to be sent to Egypt's LNG plants; or through FLNG to be sent to Egypt's LNG plants."

Yet, the country's choice for the export method will "depend on the political/security situation and the gas prices, to see which is more cost feasible and competitive to the international price markets," Kaissy pointed out.

Lebanon could further cooperate with Egypt in terms of drilling operations and benefit from the North African country's experience in drilling Zohr natural gas field. "Zohr was developed in a record time. Lebanon has to learn how to cooperate with the present operator once a gas field is discovered in order to start pumping gas as soon as possible and avoid any unnecessary delay," Zahr stressed.

Additionally, Kaissy noted that "it is quite fortunate that the same company that made the Zohr discovery, Eni, will be operating in Lebanon's deep-water," expressing hopes that "their expertise will come in handy when handling [Lebanese] unexplored deep-water and help it make early discoveries."

Until 2019, the region's oil and natural gas key players will be anticipating the start of oil and drilling activities in Lebanon's offshore blocks that might redefine the game or form new economic ties between the states. Egypt and Lebanon could perfectly benefit from each other to achieve the two Arab country's energy goals.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SOUTHERN MEDITERRANEAN LNG INFRASTRUCTURE:

EGYPTIAN-ALGERIAN COOPERATION OR COMPETITION?

By Mahinaz El Baz

The recently discovered offshore natural gas fields in the Mediterranean Sea have driven speculation on how regional natural gas markets might change and what export and energy benefits might accrue for the countries involved. Natural gas discoveries in this area might enhance regional relations as emerging gas-rich countries need to pool their resources in order to export gas in either pipeline or liquefied natural gas (LNG) form, thereby encouraging dialogue and cooperation.

"The need to adopt a joint approach to export is due to commercial, technical, or political difficulties that prevent each country from exporting gas independently," according to a paper published by the European Council on Foreign Relations (ECFR) in 2017 titled "A Flammable Peace: Why Gas Deals Won't End Conflict in the Middle East".

Although experts argue that the potential hydrocarbon reserves are huge, especially the natural gas reserves in the Mediterranean Sea, both pipelines and LNG infrastructure in the southern part of the sea are limited due to many technical and financial reasons. Egypt and Algeria are the only two African countries that have LNG terminals in the southern Mediterranean. Thus, experts argue whether the Egyptian LNG infrastructure is in competition with the Algerian facilities or whether they can cooperate with each other, raising discussions on the possibilities for future cooperation between the two countries in LNG infrastructure.

Egyptian LNG Infrastructure

There are two LNG facilities in Egypt. Both facilities have been idle since 2013 as the country has diverted its export supplies to its domestic market.

> "Egypt and Algeria have to cooperate together in this field for many reasons as they are the only countries having LNG structure in the Mediterranean countries."
>
> **Ahmed Hussein, Engineer at the Egyptian Natural Gas Company (Gasco)**

The first LNG facility is owned and operated by the Spanish Egyptian Gas Company (SEGAS) and located in Damietta, while the second LNG project is located in Idku, east of Alexandria, and controlled by the Egyptian Liquefied Natural Gas Company (ELNG).

SEGAS LNG complex in Damietta is situated on the Mediterranean Coast 60 kilometers (km) west of Port Said. The complex came on-stream by the end of 2004 and was used to export LNG to the general European market via a receiving terminal at Sagunto in Spain. Damietta liquefaction project represented the first liquefaction plant ever built in Egypt as it is a single train plant with a capacity of 5.5 million tons per annum (mtpa), according to José Javier Fernández Martínez's research paper on Damietta liquefaction project.

The operating company, SEGAS, is controlled by Union Fenosa Gas in conjunction with Eni of Italy (80%) and two state-owned Egyptian companies: the Egyptian Natural Gas Holding Company EGAS (10%) and the Egyptian General Petroleum Corporation EGPC (10%). This LNG project in considered as the first facility of its type in Egypt and experts believe that it is one of the world's largest capacity single train facilities. In late 2012, Egypt has stopped exporting Eni's share of LNG from the Damietta terminal due to rising domestic consumption, Abdalla Darwish stated in his study about Evaluation Of LNG Projects In Egypt.

The second project is the Egyptian LNG project (ELNG). It is located on approximately 3km away from the town of Idku and 40km east of Alexandria on the Egyptian Mediterranean coast. The two train LNG terminal at Idku has a capacity of 3.6 mtpa and could accept gas deliveries of around 10 billion cubic meter (bcm) equivalent to 7.4 mpta, according Darwish's study. The shareholders of the Egyptian LNG Companies are EGAS (12%), EGPC (12%), BG (38%), and Petronas (38%). Egyptian LNG can accommodate an expansion of up to six trains in total with potentially different ownerships and sources of feed gas.

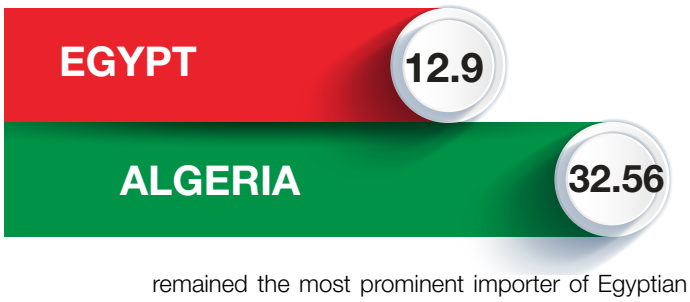
Algerian LNG Infrastructure

Algeria has four LNG units located along the Mediterranean Sea at Arzew, Bethioua, and Skikda, with a total design capacity to process 44 billion cubic meters (bcm) per year equivalent to 32.56 mtpa of natural gas, according to US Energy Information Administration (EIA). The four units include three operational LNG plants and one decommissioned plant. The three largest and very similar plants (GL1Z, GL2Z and GL3Z) are located at Bethioua and Arzew, while the GL1K plant is located at Skikda.

Two trains at the Skikda complex in Algeria totaling 9.2 mtpa were brought online in 2013 and 2014, a 2017 report by the International Gas Union (IGU) explained. The complex currently consists of four trains. It worth noting that Algeria announced during the first week of March that Skikda LNG export plant is set to take one production unit, or train, offline for 40-50 days of planned maintenance from March 9, industry sources previously told Reuters. The Bethioua project in Arzew is a 13-train LNG development with a total capacity of 20.8 mtpa operated by Sonatrach, according to Wood Mackenzie's 2015 report entitled "Algeria LNG Bethioua".

Regional Market Dynamics

Egypt used to export natural gas to several countries, such as Israel, Jordan, Syria, and Spain, yet Israel remained the most prominent importer of Egyptian natural gas. Growing domestic demand, however, led to a shortage of gas in the Egyptian market. In 2011, rising domestic consumption began to disrupt gas exports to Israel and Jordan. The next year, exports were completely cut off after the pipelines were sabotaged.



After discovering Zohr in 2015, Egypt recovered the ability to proceed alone by exporting the expected gas surplus from the field via its existing infrastructure, such as the two idle LNG terminals and the AGP. Some economic experts have predicted that it may, however, decide to work together with Israel and Cyprus to create a new Eastern Mediterranean gas hub.

As for the EU, Egypt's northern LNG terminals are the most probable sources of gas supply in the entire region. The country has the largest natural gas reserves, in addition to having its own infrastructure in place to export. In this sense, Egyptian LNG would be cheaper than either Cypriot or Israeli gas, as no large capital investment is needed. Although no supply can compete with the price of Russian pipeline gas, Egyptian gas could compete with American LNG and allow the EU to diversify their energy sources, lessening dependence on Russian supply.

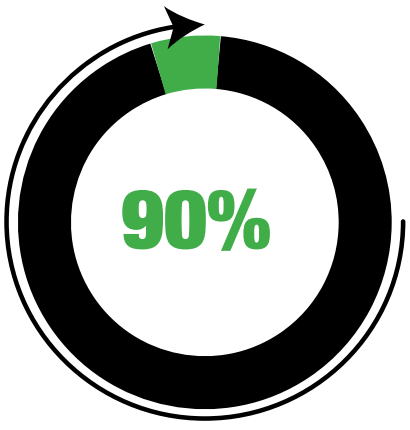
Egypt's Minister of Petroleum and Mineral Resources, Tarek El Molla, declared on many occasions Egypt's plans to increase production capacity by 50% by the end of 2018, with aspirations to re-enter the export market by 2019. Furthermore, officials have suggested that the Idku terminal could be running at full capacity by 2021, although these estimates are ambitious. It is more likely that Egypt will resume its role as an exporter by 2021- 2022 when production would have sufficiently expanded and balanced out against domestic demand.

On the other hand, Algeria exports natural gas via pipelines and on tankers in the form of LNG. The country has three transcontinental export natural gas pipelines: two transport natural gas to Spain and one transports natural gas to Italy. Most Algerian LNG volumes are delivered into Europe, although deliveries have been made into the US and Asia. It worth noting that Algeria was the first country in the world to export LNG in 1964. In 2014, Algeria was the world's seventh-largest exporter of LNG, exporting about 5% of the world's total exports.

Algeria exported about 1.5 trillion cubic feet (tcf) of natural gas in 2014 of which approximately 910 billion cubic feet (bcf) was transported via pipelines and 578 bcf by LNG tankers. Approximately 90% of Algeria's natural gas exports were sent to Europe in 2014, making it the region's second-largest natural gas supplier outside of the region after Russia. In addition, around 84% of Algeria's LNG exports were sent to Europe with the remainder going to markets in Asia and Oceania, according to EIA.

Despite new LNG export infrastructure and increased capacity, Algeria's LNG exports have declined over the past few years (although an increase in production in 2014 led to an increase in exports as well). Algeria is facing pressure to boost natural gas output with new projects to meet growing domestic demand and to fulfill long-term contractual obligations to export natural gas to Europe.

As for the mechanisms of exporting natural gas, Algeria's pipeline system transports natural gas from the Hassi R'Mel fields and processing facilities,



ALGERIA'S NATURAL GAS EXPORTS TO EUROPE IN 2014.

owned by Sonatrach, to export terminals and liquefaction plants along the Mediterranean Sea. There are three main pipeline systems in the country: Hassi R'Mel to Arzew, Hassi R'Mel to Skikda, and Alrar to Hassi R'Mel.

"The Hassi R'Mel to Arzew system is a collection of pipelines that move natural gas from Hassi R'Mel to the export terminal and the LNG plant at Arzew. The system also includes a Liquefied Petroleum Gas (LPG) pipeline. The Hassi R'Mel to Skikda system transports natural gas from the Hassi R'Mel fields to the Skikda LNG plant, and the Alrar to Hassi R'Mel system transports natural gas produced in the Alrar and the southeastern region to the Hassi R'Mel processing facilities," EIA's analysis added.

Cooperation or Competition?

In light of the fact that Egypt and Algeria are the only countries to have LNG infrastructure in the southern Mediterranean, industry experts argue whether the Egyptian LNG infrastructure is in competition with the Algerian infrastructure or whether they act in concert with each other. "There could be competitiveness between these two countries in the broader context of a gas glut. However, there are some differences that might mitigate competition. Egypt is better positioned to serve the Asian markets while Algeria is well positioned for access to terminals in southern Europe," Tareq Baconi, Visiting Policy Fellow at the ECFR, stated.

"Furthermore, the prospects of Algeria's gas sector remain unclear, as further investment is needed to sustain production. For both countries, the domestic market is large, and continues to grow given generous subsidies. The manner in which the domestic markets are served will determine each country's export potential," he added.

Other experts believe the two countries will not compete against each other. "There is no competition between Egypt and Algeria," Mohamed Farghaly, LNG Plant Manager, disclosed. Industry expert Amr Magdy Abdel Aziz, likewise stated: "Regarding the infrastructure competition, I do not believe that this is the case. The LNG market have been depending on long term contracts and will be like this for a while. So you can say that each terminal is dedicated to specific buyers. The competition is then transferred to the buyers to secure more long term contracts or to benefit from any extra or un-contracted quantities in the spot markets where the higher prices are paid."

Ahmed Hussein, Engineer at the Egyptian Natural Gas Company (Gasco), explained that both countries are mainly targeting the European market, thus there will be some aspects of competition in the future. Currently however, the two countries are not competing with each other. One reason for this is that the Algerian LNG infrastructure is bigger than Egypt's infrastructure in terms of production capacity. Egypt has two LNG plants with total maximum production capacity 9 million ton per year, while Algeria has four LNG plants with total maximum production capacity 24 million ton per year.

Moreover, in 2016, Egypt began to export LNG again after a long time of LNG production problems, due to the large domestic consumption. Further to this, Egypt is currently importing natural gas, which is expected to be halted by 2019. "Even when Egypt [resumes] exporting LNG, we are targeting different countries in Europe compared to Algeria," Hussein added.

Experts' answers are varied when asked about the possibility for future cooperation between the two countries in terms of LNG infrastructure, joint research and development (R&D), developing maintenance technologies and exchanging experiences. "Possibly, however, the frameworks of such cooperation remains unclear. For the time being, each country is preoccupied with the internal reforms that are required to stabilize their energy market, address domestic consumption, secure foreign investment, and maximize their export potential," Baconi highlighted.

"In Egypt, the performance of the terminals is highly appreciated from the shareholders whether in the technical part or the commercial part. The Egyptian experts are very professional in handling any technical issues and very talented in solving new challenges. Also due to currency prices, the terminals are very competitive regarding the operating costs. Cooperation between terminals is very common whether by exchanging experts or exchanging best practices. In Egyptian terminals we are exchanging knowledge and experience with many other terminals all over the world, even professionals who moved to other international terminals proved to be of the best experts," Abdel Aziz said.

> "There is little commercial sense to invest in new LNG terminals... If investments are to be made, they are best targeted to the current infrastructure."
>
> **Tareq Baconi, Visiting Policy Fellow at the ECFR**

Furthermore, Hussein highlighted that "Egypt and Algeria have to cooperate together in this field for many reasons as they are the only countries having LNG structure in the Mediterranean countries. [Both countries] can face many threats in future, so supporting each other with sharing information and technology will help them to grow faster. Also [cooperation] in the research and development field, will help them to grow bigger and to develop their infrastructure to have a bigger share in the European countries."

Due to the effect that new natural gas discoveries in the Mediterranean and increasing prices have had on market dynamics, there is a new debate about whether there is a need for more LNG projects in the region or whether it is better to invest further in developing the already-established terminals and plants. "There is little commercial sense to invest in new LNG terminals given the state of the global gas markets and the presence of the American LNG. If investments are to be made, they are best targeted to the current infrastructure," Baconi explained.

Abdel Aziz also mentioned that "building new terminals in the current global situation is very costly and needs to secure contracts first to be able to complete FID and secure loans. Pumping more investments in the current infrastructure such as debottlenecking in Qatar Gas will be more effective if more feed gas is provided locally or from other countries."

Although industry experts argued over the current relationship between the Egyptian LNG infrastructure and the Algerian facilities and if they compete or cooperate with each other, they stressed on the importance of considering future cooperation between the two countries in LNG infrastructure. Such cooperation could maximize the regional integration and benefit both exporting and importing countries.

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THE FUTURE OF INTEGRITY MANAGEMENT FOR DEEP-WATER EQUIPMENT IN EGYPT

By Mahinaz El Baz

Offshore oil and gas operations are getting more sophisticated and remote, as it is difficult to access into the equipment under extraordinary conditions in remote subsea and deep-water locations. Besides, the inspection needed to ensure integrity of equipment at distant and deep offshore locations is costly.

Industry experts believe that this lack of visibility can lead to expensive unscheduled maintenance and non-productive time (NPT), oil spills or accidents; resulting from failing equipment. Even small improvements in efficiency can yield significant savings, according to MapR Technologies' White Paper about Predictive Maintenance in 2015. Improving production efficiency by 10%, for instance, can yield up to $220-260 million bottom-line impact on a single brownfield asset, McKinsey estimates showed.

"Oil and gas companies have a major opportunity to increase efficiency and reduce operational costs through better asset tracking and predictive maintenance. With falling oil prices, companies are facing increasing pressure to reduce operation costs and opt to manage the business more efficiently. Many companies are not operating their assets at optimum production efficiency," MapR's paper noted. Despite the current challenging international market dynamics, international oil companies (IOCs) are investing in developing new technologies to raise the efficiency of current inspection and integrity techniques.

COMPLEX CHALLENGES

The increasing energy demand pushed IOCs to intensify their exploration and production (E&P) activities in both onshore and offshore fields. However, things are slightly different in offshore fields, as the use of subsea equipment and systems to produce hydrocarbons has brought new challenges and created demand for more efficient maintenance strategies.

"Subsea systems are often standardized up to a certain level, individually customized, and usually robust solutions to ensure high reliability. The subsea systems often consist of complex equipment designed to perform critical functions and to overcome extreme conditions. Nowadays they are designed to work in increasingly deeper water at more remote locations," according to Jorge Trejo and Tore Markeset's paper entitled "Identifying Challenges in the Maintenance of Subsea Petroleum Production Systems".

Hence, maintaining deep-water equipment requires special attention, due to its exceptional conditions. "Equipment maintenance in deep water or what is referred to in a broader manner as Subsea Integrity Management (IM) in deep water is facing a lot more challenges than a typical onshore development; inherited challenges include but not limited to remote locations, harsh environment, technological challenges and high costs," Ahmed Mahran, Subsea Development & Integrity Management Professional, told Egypt Oil & Gas.

Mahran further explained that "projects already underway ranging from the Gulf of Mexico to West Africa, have reached almost 3,000 meters under water. With manned diving underwater operations limited to only roughly 180 meters, this has restricted accessibility to subsea infrastructure intervention, inspection, and maintenance to robots commonly referred to as Remotely Operated Vehicles (ROV). Similarly, all subsea repairs at such water depth have to be automated. This is only one part of complexity."

Affirming on Mahran's opinion, Ahmed Abo Bakr, Subsea Engineer, explained to Egypt Oil & Gas that "equipment installed in deep water are facing more complex challenges than equipment in shallow water. The deep-water maintenance challenges are diverse. Technical factors and economic drive are always there, due to the costly and complex nature of deep-water operations. Yet what comes first is experienced and competent manpower."

"There are a lot of challenges facing equipment maintenance in deep-water," Amr Manhawy, General Manager at Seaharvest Oil & Gas Services, told Egypt Oil & Gas. "The main three challenges are harsh working conditions -like High Pressure High Temperature (HPHT) operating environment- access deep-water equipment like wellhead, completion equipment and applying service, in addition to high cost of maintaining deep-water equipment," he illustrated.

EGYPT'S ADDITIONAL CHALLENGES

In Egypt's deep water, companies face additional challenges. "Egypt has been into the deep-water business for a considerable time, and this has helped develop the experienced workforce. But with the recent expansions, the country needs to upgrade its base of skilled and experienced personnel, in order to build on the past experiences; rather than starting from scratch," Abo Bakr stated. .

"Another challenge is the intervention cost. This highlights the need of introducing shared economy between deep-water operators in the Mediterranean. Additional challenges manifest in the coordination between operators to achieve unification and standardization of deep-water systems and components, as such approach will ensure interchangeability of equipment and spare parts, minimizing the maintenance cost and shortening downtimes and shut downs," Abo Bakr added.

"Moreover, the aging of current systems is considered a challenge. The need for upgrade sometimes is a must. Besides, the sparing strategy needs to be progressive. Imagine having a spare part on shelf for 10 to 15 years, it would probably fail when being used due to long shelf time. Furthermore, incorporating software maintenance management more and more will result in better tracking and effective results," he said.

One final important aspects that needs development, is "having emergency response scenarios and plans for action in case of major failures, like pipeline or control lines failure for example. Having such plans in place will ensure the reliability of the deep-water production in the country," Abo Bakr added.

Industry experts believe that challenges related to maintenance of deep-water facilities could be avoided by proper design, as well as by planning, and structured maintenance strategies in the design phase. However, it is a challenge for the IOCs to define

maintenance strategies for reducing maintenance cost. Most of the subsea production facilities are customized designs requiring customized tools and equipment for maintenance interventions, according to Jorge Trejo and Tore Markeset's paper.

UNUSUAL SOLUTIONS

The disasters in the Gulf of Mexico have made IOCs think further about installation integrity, security and ecology, as laws and regulations will be implemented focusing on avoiding such events in the future. The companies are currently trying to minimize failures, focusing their strategies on preventive maintenance with the purpose of maintaining the integrity of the installation. "The maintenance strategy should be addressed in the design phase to be able to take the best economic decisions", Jorge Trejo and Tore Markeset's paper noted.

Maintenance strategies entail the use of specialized equipment and vessels to carry out subsea interventions. The costs for carrying out preventive maintenance are significantly lower compared to the costs of unpredicted failures, where in some cases it is necessary to reduce or stop the oil production. Moreover, the front-end engineering design (FEED) study is another tool used to evaluate costs and activities in the early phase of the interventions, using divers, as well as to identify critical stages in the field life cycle as a result of corrosion or load fatigue. Failures may be predicted in advance, due to using condition monitoring and analysis of real-time data.

IOCs collect a vast amount of data through sensors in their digital oilfields around the world. A typical offshore production platform can have more than 40,000 data tags, though many may not be connected or used, according to McKinsey estimates. While many companies use oilfield sensors to monitor real-time data on operations. The data is not often stored and analyzed to help predict potential equipment problems.

However, such solutions, if applied accurately, they might enable the companies to plan the maintenance interventions and reduce the costly unplanned downtime. Hence, optimizing the subsea maintenance interventions is reducing the use of specialized and costly vessels, the paper added.

"Various techniques are being applied to suit the nature of operation; run to fail and condition-based maintenance as well as preventive, periodic and corrective maintenance are being all incorporated. The deep-water technology is standard and based on redundancy and high reliability, but problems occur with unforeseen events, and such events usually require customized solutions," Abo Bakr noted.

> "[It is essential to] introduce Egypt not only as an emerging gas hub, but also as a deep-water maintenance hub, inviting manufactures and service providers to establish service centers in Egypt to cater for the whole region."
> Ahmed Abo Bakr, Suebsea Engineer

EXPERT'S SOLUTIONS FOR EGYPT

When asked about the currently implemented maintenance techniques in Egypt's Mediterranean deep water, Mahran explained that "Egypt's first deep-water development in West Delta Deep Marine (WDDM) concession in Mediterranean Sea was developed and put on production some 15 years ago in 2003. Since then there has been ongoing subsea inspection contracts and integrity management work. However subsea integrity management operations in Egypt are less developed and are highly affected by cost-cutting measures, mainly due to reluctance to invest on costly maintenance programs, global market conditions, and overdue debts to IOCs."

"With recent investment and development of multiple mega projects as Zohr in Shorouk concession, North and West Alexandria concessions in West Nile Delta (WND), and North Damietta Concession in East Nile Delta (END), it is clear that there are ongoing efforts to set-up a more in depth integrity management strategy and plans to cover highly critical new subsea assets," he added.

In the same context, Manhawy mentioned that Egypt is currently using the conventional techniques and applying API standard when it comes to regular maintenance, however "few operators forces the service provider to provide prior-job inspection report to prevent and possible down time."

NEW TECHNOLOGIES AND INNOVATIVE TECHNIQUES

The rapid progress of technology such as big data and analytics, sensors, and control systems offers IOCs a chance to automate high-cost, dangerous, or error-prone maintenance tasks in deep water. Most oil and gas operators are starting to capture these opportunities.

There are many ways in which automating maintenance can improve production efficiency. For instance, radio-frequency-identification tagging of equipment, along with the use of other sensors, can help track activity. Tracking, in return, enables applications that can monitor the condition of equipment and support predictive maintenance and automated operations shutdowns. These applications minimize risk of catastrophic failures and process disruptions, while maximizing equipment reliability and production efficiency, according to Mckinsey & Company's article entitled "Digitizing oil and gas production".

Another innovative technique is using deep-water pipeline repair robotic systems. "Since there are many requests to repair deep-water pipelines from the IOCs, StatOil and Chevron have developed pipeline repair robotic systems. The pipeline repair robots can work for water depths down to 1,000 meters," according to Heping Chen's research paper entitled "Opportunities and Challenges of Robotics and Automation in Offshore Oil & Gas Industry, 2014.

INTEGRITY STRATEGY PREREQUISITE TO TECHNOLOGY

In Egypt, experts believe that there is a serious intention to apply new technologies in the near future to maximize the efficiency of maintaining deep-water equipment. However, there are other priorities before implementing new technologies.

"The advancement of technology brings new solutions every day. Egypt as well as other countries would benefit from that, especially when it comes to subsea inspection. Accessing more results with lesser costs, but also what Egypt needs more is a national strategy for asset integrity and maintenance. Such strategy is to cover all operators in Egypt and harmonize the activities to ensure better results with less cost," Abo Bakr highlighted.

On another note, it is essential to "introduce Egypt not only as an emerging gas hub, but also as a deep-water maintenance hub, inviting manufactures and service providers to establish service centers in Egypt to cater for the whole region. This will enable the country to minimize the cost and turnaround time to get needed repairs of deep-water equipment. Egypt additionally needs to have a strong local supply chain and service providers, to strengthen the response and effectiveness," Abo Bakr added.

From his side, Mahran agrees with Abo Bakr, as having an integrity management strategy is a priority to be considered before applying new technologies. "Historically, the term integrity management is usually foreseen by operators in Egypt, as the program of inspection during operation with typical integrity programs concentrating around inspection management. Such an inspection management strategy may be well suited for static equipment or structures with good accessibility to conduct visual inspection, cathodic protection (CP) surveys, and ultrasonic testing (UT). However, subsea systems additionally experience highly dynamic loading due to environment combined with internal and external corrosion issues," he noted.

Mahran further explained that "an integrated integrity management program should employ roles of risk assessment in integrity management planning, and post inspection integrity assessments from a third party; both activities are deemed essential in ensuring risk based integrity assurance, which targets critical components providing justification for each inspection, monitoring, or mitigation activity based on the probability of failure and the consequence for not only personal safety and the environment but also asset availability."

ROLE MODELS

Experts believe that following successful role models can benefit Egypt. "I would suggest applying different methodology. We have to apply the concept of preventive maintenance, especially in the deep water, as the cost of drilling and maintenance is high and any encountered down time is very costly.

Applying preventive maintenance model has proved records worldwide in decreasing the Non Productive Time (NPT) of the rig. We have to add clause in each tender that force any service provider to do certain inspection and tests on their equipment, while being in base by a third party, prior to sending it offshore. This will decrease the cost of the equipment maintenance and decreasing the NPT," Manhawy highlighted.

From his side, Mahran believes that the North Sea experience is one of the best models for Egypt to simulate. "Global subsea integrity management market is well developed and supported by various service providers in certain geographical areas as North Sea, Gulf of Mexico, and Australia," he said.

"Similar to subsea project developments scheme, the most nearby model that Egypt could follow is the North Sea experience at both sides of United Kingdom Continental Shelf (UKCS) and Norwegian Continental Shelf (NCS). Partly as a result of offshore incidents, both examples have further developed and matured on regulators, operators and suppliers sides," he added.

In the light of deep-water maintenance challenges, industry experts recommend having an integrity management strategy in Egypt to be able to raise the efficiency of managing the subsea facilities. Moreover, there is an opportunity to utilize predictive analytics in Egypt, which will help identifying when equipment and assets are likely to fail or need service, and to perform preventive maintenance to minimize costly, unscheduled downtime.

HYDROCARBON RECOVERY IN DEEP-WATER RESERVOIRS: CHALLENGES AND TECHNOLOGIES

By Mahinaz El Baz

Hydrocarbon recovery in deep-water presents a unique challenge to oil and gas operators. Safe drilling operations and protecting the environment are primary requirements, in addition to minimizing risks and maximizing recovery. With average worldwide rig day rates remaining higher than $300,000 - drill ships and semisubmersible rigs -, there is no chance for unexpected costs resulting from nonproductive time, according to Baker Hughes.

Accordingly, developing a deep-water reservoir requires planning and proven dependable expertise to achieve efficient and flawless execution in some of the most difficult formations and complex wells. When savings of millions of dollars can be gained, operators look for solutions that work and the people that can provide them.

Thus, the challenges found in deep-water drilling and recovery operations have, in a remarkable short period, imposed international oil companies (IOCs) to develop new significant technologies and advanced techniques. The geological characteristics of the deep-water environments have pushed design criteria, normally used in onshore and shallow-water wells, to values beyond their traditional limits.

Challenges Facing Deep-water Reservoirs

IOCs are facing new challenges in developing deep-water reservoirs and increasing their productivity. The key challenges involve areas of safety, environment, low permeability, concept design, cost, flow assurance, and equipment reliability, as John Cromb, Senior Deep-water Drilling Engineer at Texaco Worldwide Exploration and Production, stated in his research paper entitled “Managing Deep-water Risk and Challenge”.

Many of the deeper reservoirs tend to have very high pressures and temperatures that exceed the industry’s current ability to produce them. In many cases, the industry lacks production analogues for these reservoirs, which has greatly increased uncertainty in predicting well performance and ultimate recovery, and variables that are fundamental to ensuring the commercial success of a project, according to Richard Souza in his article entitled “Future deep-water developments bring challenges, opportunities”.

High cost is another challenge facing the development of deep-water reservoirs. “As a consequence of escalating complexity and uncertainty of frontier deep-water projects, the industry is struggling to quantify and manage project complexity, capex, and risk required to achieve predictable project outcomes,” Souza noted. An analysis examined a sample of 130 oil and gas mega projects executed from 2003-2015 and concluded that only about 1 out of 5 projects could be reasonably defined as successful -measured by how well sanctioned cost and schedules are met. The rest were unimpressive with average cost and schedule overruns of 30%, he added. It worth noting that most deep-water projects today fall into the mega project category.

Thus, industry experts believe that deep-water completions should maximize ultimate recovery for projects to be economically viable. Newly discovered deep-water reservoirs are capable of high flow rates and the wells must be designed accordingly, added Cromb. In addition, the cost and inaccessibility of deep-water wells require to rely heavily on new innovative techniques and advanced technologies to optimize the capital expenses on projects.

Although new technologies are essential for deep-water reservoirs recovery, there are risks in using technology that has not been strictly tested for reliability. It worth mentioning that reliability problems during the life of a well show up in the form of reentry and workovers, which must be optimized to be able to achieve the project economics. Problems may result in information damage, lost reserves, and safety and environmental exposure, Cromb highlighted.

Maximizing Recovery from Deep-water Reservoirs

Increasing recovery rates from deep-water reservoirs requires a full understanding of the behavior of hydrocarbon mixtures as they move from extremely deep rock formations, through complicated subsea piping systems, to surface facilities. The extreme variations in temperature and pressure along this path

Industry experts believe that deep-water completions should maximize ultimate recovery for projects to be economically viable.

can present unique challenges to equipment designers, according to the National Energy Technology Laboratory.

The currently implemented techniques to recover deep-water reservoirs consist of "SPAR Platform and floating production system & offloading (FPSO)," Asser Ammar, Subsurface Manager at Transglobe Energy Corporation, told Egypt Oil & Gas.

In addition to those techniques, groundbreaking deep-water-specific technologies are another way to increase recovery rates. These technologies enable new reserves to be recoverable that were not previously accessible, further maximizing recovery in deeper, more complex, and more remote environments while minimizing nonproductive time without sacrificing safety, quality, or ecological responsibility, according to Halliburton's research paper on deep-water challenges.

"Subsea processing is one of the most effective technologies used by operators to increase reservoirs recovery. The traditional approach to subsea processing has been the installation of multiphase pumps in close proximity to the wells. Multiphase pumping, or boosting, improves the economics by reducing back-pressure on the reservoirs, increasing flow rates and total recoverable reserves," according to Oil & Gas Magazine's article entitled "Increasing Deep-water Reservoir Recovery with Subsea Boosting Technology".

Industry experts believe that deep-water is primarily about light oil in high quality reservoirs. "Some heavy or poorer quality oils do exist (e.g. Brazil), yet they are a small part of the current mix. Enhanced oil recovery is not a significant factor even in the shallower regions of offshore. However, as the easier oil is developed over the next few decades, [there is] the potential for the emergence of new technologies to enable the economic development of more difficult hydrocarbons in deep-water regions. This could include not only heavier oils, but wholly unconventional hydrocarbons such as hydrates. However, experts argue that offshore hydrates will remain more costly than less exotic alternatives for the foreseeable future," the National Petroleum Council Oil&Gas study about deep-water pointed out.

Success Story: the Gulf of Mexico

An empirical research paper entitled "Improve Ultimate Reservoir Recovery from Deepwater Wells in the Gulf of Mexico Using an Emerging Subsea Processing System" presented an emerging subsea processing system that comprises several deep-water wells equipped with electric submersible pumps (ESPs) and one or more seabed booster pumps. This system provides efficient reservoir hydrocarbon recovery by maximizing pressure drawdown at the sand-face. The in-well ESPs increase the pressure drawdown to improve production throughout the life of the reservoir, while the subsea booster pump lifts the combined production from all wells to reach the processing facilities at sea surface. This system integrates several production technologies to optimize performance, lower operating costs and support reliable and safe operation.

The Lower Tertiary trend (LTT) in the Gulf of Mexico (GOM) poses a number of documented challenges for flowing reservoir fluid from the sand-face to surface facility. As most of the deep-water reservoirs, the key challenges are operations, due to low permeability, high pressures, high temperatures, and water and well depths. The empirical research aimed to test the feasibility of the subsea processing system and quantify its production performance for a typical LTT field. Thus, it included development of a full field system layout and simulations of production performance for a range of reservoir and system assumptions. In addition, operational issues, such as system stability, power balancing, and basic control methods, were considered, including the use of transient simulations, to ensure a reliable and efficient operation of the system.

These form the basis of a unified pump control methodology. To verify the impact of in-well ESP reliability on field performance, a comprehensive availability model was developed using reliability data for individual system components; ESP reliability, ESP intervention time, and rig deployment time were varied to determine their impact on overall system availability. The results of the availability model were then combined with the steady-state production results to define production availability and calculate a range of internal rate of return (IRR) values for a typical LTT field development.

Utilization of the system showed enhancement in oil recovery in the range of 20 -50% over use of a seabed boosting pump alone and substantial improvement in total liquid and oil gain as compared to natural lift. The system resulted in very satisfactory IRR and achieved production availability targets by using alternatively deployed ESPs. Moderate improvement in in-well ESP reliability combined with shorter rig mobilization time for intervention shows significant improvement in production availability. In total, the combination of seabed boosting pumps and in-well ESPs should be considered as a viable method of enhancing recovery from challenging deep-water subsea fields such as those of the LTT in GOM.

The unified pump control methodology is the key to safe and reliable operation of the system. The empirical research paper successfully presented an approach on how to operate ESPs safely, by minimizing transient responses and shifting total operating load as much as possible to the seabed pumps, thereby reducing stress on the ESPs. Furthermore, the development of an enhanced production availability model of the system quantifies the production performance for a variety of field scenarios and subsystem behavior.

Deep-water Recovery in Egypt

In Egypt's prospective deep-water areas, the spectrum of technology available today to understand and optimize the life cycle value of a discovery is especially important, due to the complexity of many of the productive zones, according to Oil&Gas Journal. Using innovative techniques enhances reservoir understanding, and leads to a more accurate estimate of reserves and a better well and reservoir optimization.

Tackling the main challenges facing deep-water reservoir recovery in Egypt, Ammar explained that drilling cost is one of the main challenges, yet it can be reduced by creating realistic field development plan, which leads to the right direction in regards of the best number of wells to be drilled per year. In addition, FDPs, which

> Increasing recovery rates from deep-water reservoirs requires a full understanding of the behavior of hydrocarbon mixtures.

are translated from business plans, impact the drilling schedule and drilling ships contracts. "Production techniques can be optimized by following opportunity reposition process in which production concept will be optimized and selected out of multiple development techniques, which will affect the entire project," Ammar added.

When asked about the new technologies in deep-water reservoir recovery, Ammar mentioned that there are many technologies, like multiple fracs horizontal wells. As for Egypt, the used technology in any deep-water reservoir is depending on the IOC' strategies and agreements with the Egyptian Ministry of Petroleum and Mineral Resources, as once these fields are discovered and brought online, all exploration costs will be on cost recovery.

Omar Azim, an Expert in Reservoir Engineering, highlighted that "the challenges in deep-water drilling are mainly the high cost and bad weather." As for Egypt, there is a need to pump extra investments in deep-water activities, through acquiring geological and seismic data to encourage foreign partners to drill in such areas. Azim additionally highlighted the importance of collaboration between NOCs and IOCs, as Egypt will not be able to invest in such projects independently, due to the high cost. Egypt needs foreign partners to invest in new technologies and techniques as well, he noted.

Deep-water recovery is changing dramatically in terms of technology, concept design, and the complexity of operations. As a result, the oil and gas industry will be continually challenged to sustain the growth of deep-water operations through increasing the recovery rates. This will urge the need to invest in new technologies and provide innovative solutions to the potential technical challenges.

ASSESSING THE FUTURE POTENTIAL OF GAZA MARINE FIELD

By Matthew Hoare

In early March 2018, sources within the Palestinian Authority (PA) provided additional confirmation that the largest stakeholder of the Gaza Marine natural gas field – Royal Dutch Shell – is in the process of divesting their stake. Back in January 2018, several industry insiders revealed that the Anglo-Dutch oil giant was looking to offload their stake in the field – and that it was struggling to find a willing buyer. Two months later, Palestinian cabinet ministers officially announced that they were indeed searching for a replacement international company to invest in the field and finally initiate its development.

These recent developments are the latest in a long string of setbacks that have dogged the Palestinian gas field since its discovery by British Gas (BG) in 1999. Now, as Shell prepares to offload the stakes purchased by BG almost 20 years ago, oil and gas experts question what the future holds for the Gaza Marine field.

GAZA MARINE: EXPLORATION AND DISCOVERY

Since Noble Energy's discovery of the Tamar Field in 2009, the Levant Basin has become the subject of intense economic and political interest, resulting in several large natural gas fields being found - most notably the Egyptian Zohr field and the Leviathan field located in Israeli territory.

Although the ensuing Mediterranean gas rush has only kicked off within the last decade, British Gas's discovery of Gaza Marine occurred a decade prior in 1999, when the PA granted an international consortium with a 25-year license for the Gaza maritime territory. This license provided the stakeholders not just with exploratory rights, but also the right to develop any discovered fields and install the required infrastructure. BG took a 90% stake in the license, while the Consolidated Contractors Company (CCC), the largest construction company in the Middle East, bought the remaining 10%.

Under the terms of the agreement, CCC and the Palestine Investment Fund (PIF), a PA-affiliated organization tasked with channeling investments into the Palestinian territories, could increase their share in the field to 40% during the development stage. One year later, BG drilled two successful wells in the area - Gaza Marine 1 and Gaza Marine 2 – and estimated that there may be up to 1 trillion cubic feet (tcf) laying in Gaza's waters. BG's 2001 technical review outlined plans to construct a pipeline to a processing facility located either in Israel or Gaza, and the PA approved the Development Plan the following year.

In the years that followed, the consortium's attempts to start the initial phase of development were hamstrung by political and corporate disagreements. Then-Israeli President Ehud Barak's decision to allow the PA to award the license was premised on the condition that the Palestinians would supply Gaza Marine's surplus fuel to Israel – a commodity that successive Israeli governments were unwilling to pay market price for.

The negotiations that followed between BG and the Israeli government lasted until 2007, six years without agreement. Compounding the problems were a series of legal challenges mounted by Yam Thetis, an Israeli gas consortium, who disputed the awarding of the concession to BG. While a 2001 court case ruled in favor of the British company, Yam Thetis succeeded in blocking the Israeli government from signing any agreement with BG without a tender after the Israeli court deemed it uncompetitive. Stalled agreements with the Israeli government, the election of Hamas in 2007 and the outbreak of war in 2008 resulted in BG closing its office in Tel Aviv, a signal that the company had finally exhausted its efforts to negotiate an agreement.

> We confirm we have been in discussions with various parties about the future of the Gaza Marine project. As of now, Shell continues to hold its equity in the Gaza Marine asset.
>
> **A Shell Spokesperson**

SHELL AND GAZA MARINE DIVESTMENT

In 2016, Shell become the majority shareholder of Gaza Marine after it completed its $52 billion buyout of the BG. A year later media reports surfaced that the PIF was in talks with Shell regarding the field's development. However, by the start of 2018 it became clear that Shell was looking to offload its stake. Details of the current negotiations as well as Shell's reasons for divesting remain murky. When asked to comment on the sale and the ongoing negotiations, a Shell spokesperson told Egypt Oil & Gas: "We confirm we have been in discussions with various parties about the future of the Gaza Marine project. As of now, Shell continues to hold its equity in the Gaza Marine asset."

In response to the collapse in oil prices, the company has embarked on a $30 billion divestment strategy between 2016 and 2018. A November 2017 financial update reveals that the company has so far divested $23 billion of its assets, deals worth $2 billion have been announced and $5 billion more are currently in the advanced stages.

Tareq Baconi, visiting fellow at the European Council on Foreign Relations, told Egypt Oil & Gas that Shell's reasons for divestment are likely twofold. "I think the Gaza Marine is a small possibly inconsequential asset for Shell and certainly fits into the broader divestment strategy that Shell is pursuing", he said. "But I also believe that Shell has reached the same conclusion as BG before it, which is that the field will not be political viable in the near or medium term."

GAZA MARINE: LOCATION, INFRASTRUCTURE AND INVESTMENT

LOCATION

The Gaza Marine field lies 30 km from the Levantine coast at a water depth of 603 meters. The depth of the field is shallower than either the Tamar or Leviathan fields (1,676 meters and 1,645 meters, respectively) and it lies closer to the shore, making Gaza Marine simpler to exploit from a logistical standpoint. Palestinian maritime territory - as agreed during the Oslo process – covers 20 nautical miles (37 km) and is delineated into three zones: zone L (the central area), zone K (the area bordering Israel) and zone M (the area bordering Egypt. Despite this agreement, the 2001 court case brought by Yam Thetis resulted in the judge declaring the area a "no man's water", throwing its legal status into ambiguity.

Problems were exacerbated in 2007 when Hamas won the Palestinian legislative elections, triggering a series of events that would lead to Israel enforcing a naval blockade of the Gaza Strip. This blockade has since made it impossible for the PA to exercise sovereignty over the maritime territory allocated by the Oslo Accords. Moreover, Israel is reluctant to allow production from Gaza Marine because of fears that it would aid Hamas. Until a thawing of relations between Hamas and Israel take place, it is unlikely that Israel will relax the blockade and permit Gaza Marine development.

INFRASTRUCTURE

Exploiting Gaza Marine's reserves will require the construction of new onshore and offshore infrastructure. According to BG's original development plans, well heads would be constructed on the sea bed and a 50 km sub-sea pipeline would be laid connecting Gaza Marine to a receiving terminal at Ashkelon, an Israeli city 10 km north of the Gaza Strip. The gas would then be sold to an Israeli public sector organization who would then distribute it to the Israeli market. An onshore pipeline would be constructed between Ashkelon and Gaza at a cost of around $6-7 million.

A separate plan proposed by the Yam Thetis consortium sees Gaza Marine being connected to the nearby Mari platform via a sub-sea pipeline. The platform would treat the gas before sending it to Israel via Yam Thetis's existing infrastructure and delivering it to Gaza via a new pipeline between Mari and Gaza power plant.

Regarding the Palestinian energy market, current plans see Gaza Marine feeding three power plants: two in the West Bank (a 400MW plant in Jenin operated by the Palestinian Power Generation Company and a 200-400MW in Hebron) and one in Gaza (with a current capacity of 140MW). Mohammad Mustafa, former minister of national economy and current chairman of the PIF, has stated in 2016 that he hoped that the construction of the Jenin plant would serve as a precursor to a gas purchase agreement and the development of Gaza Marine. While the Jenin power plant was completed in mid-2017, its construction is yet to lead to any kind of breakthrough in terms of developing Gaza Marine. Furthermore, there are not currently any plans for the development of the gas network that would be necessary for natural gas to reach the West Bank.

INVESTMENT

Responsibility for channeling investment into the project lies with Massader, a subsidiary of the PIF established in 2015 to coordinate finance for large-scale infrastructural and upstream oil and gas development projects. The fund is chaired by Mustafa, who has been honest about the difficulties that the PIF has experienced in attracting finance. In 2016 he wrote that locating funding streams will be a challenging task due to the fact that agreeing a final Gaza Marine deal is dependent on finding a long-term, credit-worthy buyer of Gaza Marine gas willing to bulk buy at market value.

There are varying estimates about how much money is required to fully develop the field. In 2012 the PIF reported that $100 million had already been put into the project and that a further $800 million was needed for further exploration and infrastructural spending. The PIF's 2016 annual report, however, states that the field requires $1.25 billion of capital investment.

SEARCHING FOR A BUYER

There seems to be consensus that Gaza Marine would be an economically-viable project if it could attract the requisite capital investment. Gas fields with more than 1 tcf of gas are generally seen as providing commercial opportunities, and revenue estimates vary between $2.4 billion and $7 billion, although the upper estimation is based on the assumption that gas is sold at around $10 per million British thermal units.

While there is consensus that Gaza Marine is an economically-viable project, this may be dependent on the gas being sold both inside and outside of the small Palestinian energy market. A 2007 UN review of the Palestinian sector argued that development costs could be justified if gas was sold either to the Israeli market or shipped to Egyptian liquefaction facilities for export. Additionally, a Jordanian official expressed the government's desire to renegotiate a deal to import gas from Gaza Marine in 2016, emphasizing that the agreement is "very important to us, a priority". The Jordanian government previously signed a letter of intent with BG to import between 150 and 180 million cubic feet per day from Palestinian gas fields.

Although the field has potential for generating revenue, Gaza Marine is small in comparison to other fields and it is possible that large companies such as Shell may decide that the potential profit does not merit the energy necessary to initiate development. Instead, a smaller company may exert more effort into making production a reality.

"Gaza Marine's fate depends on the player that ends up acquiring this asset, and their willingness to invest in the kind of diplomatic push necessary to allow for production from this field to begin. A smaller or medium sized player might be more dedicated to seeing production from this field than a large player such as Shell," Baconi explained. "But", he added, "…the future of the field sits within Israeli decision-making."

> Gaza Marine's fate depends on the player that ends up acquiring this asset, and their willingness to invest in the kind of diplomatic push necessary to allow for production from this field to begin.
>
> **Tareq Baconi, Visiting Fellow at the European Council on Foreign Relations**

The final sentence here is crucial; politics will determine whether the Gaza Marine project succeeds or fails. There have been several major changes over the past 6 months – the Fatah-Hamas reconciliation deal and the US decision to move its embassy to Jerusalem among them. These, however, have not caused Baconi to be any more optimistic about the project's future. "The reconciliation agreement does not prevent Hamas from having a security grip on the Gaza Strip, and Israel and the US appear bent on promoting humanitarian interventions in Gaza in a manner that reduces the cost on Israel…. I think for the time being development from Gaza Marine is unlikely."

The seemingly-perennial delay to the field's development shows no sign of abating. Until a political agreement is in place that allows the Palestinians to exercise their right to develop the field and ends the Israeli blockade it is unlikely that any advancements will be made, no matter which company ends up purchasing Shell's stake.

FRANCE'S BAN OF FOSSIL E&P BY 2040, A SYMBOLIC OR INFLUENTIAL MOVE?

By: Omnia Farrag

The Paris Agreement aims to limit climate change through reducing air pollution with a long-term goal of reaching net zero greenhouse gas emissions. Under the agreement, the French government has started to take steps toward reducing its fossil fuel usage.

In July 2017, the French Minister for the Ecological and Inclusive Transition, Nicolas Hulot, announced that France is ending the sales of gasoline and diesel vehicles by 2040. This decision will come to force only if the French parliament approves it, as Radio France Internationale (RFI) reported. Yet, Hulot added that France is further planning to terminate the use of coal to generate electricity after 2022 and it will be carbon neutral by 2027. In December 2017, the French parliament passed a law that bans hydrocarbon production and exploration in France and its overseas territories of Guyana in South America starting from 2040. This law makes France the world's first nation to terminate hydrocarbon exploration and production.

France's announcements seem to be very ambitious; however, commentators believe that these steps will not cause huge change in France and globally since France produces and consumes little amount of oil and gas. Some experts described the previously mentioned law as "symbolic" as France produces only 1% of its hydrocarbon needs - 815,000 tons of oil per year from Guyana, an amount produced in few hours by Saudi Arabia.

The French energy mix shows that fossil fuel is of limited importance in the French energy sector. The 2016 French energy mix shows that oil is not used to generate electricity - only 6% of the electricity produced in France in 2016 was by gas and 2% was by coal. The European country depends to great extend on nuclear energy as 73% of electricity produced in 2016 was through nuclear source.

On the other hand, economists and environment experts believe that these decisions are not totally symbolic; they do have an impact. "It is symbolic from the [oil and gas] industry point of view, but from the environmental point of view it is not symbolic as it is estimated that diesel vehicles pollute more than the others," Pascal Devaux, Senior Economist at BNP Paribas Bank, told Egypt Oil & Gas.

"Oil and gas companies consider the environmental impact of this industry. From my position at Haliburton Egypt, I can tell that we, along with other international oil companies, abide by the national and international environmental standards; however, it is always important to look for and develop renewable energy option due to the fact that fossil fuel will dry one day," Waleed El-Ghamrawy, Health, Safety, and Environment Coordinator at Halliburton explained to Egypt Oil & Gas.

Devaux further stressed that environmental decisions have environmental, political, and economic impacts. "Consequences on the French economy will be very gradual and limited as people will have time to adapt to those new conditions. Car producers will be the most impacted as France is the European country with the highest proportion of cars fueled by diesel. Nevertheless, the proportion of diesel cars has started to change for several years. It was 64% of cars sold in 2014 and 41% in 2018," he explained.

The decision will also have a political and socio-economic consequences from Devaux's point of view. "Diesel vehicles are more used in the countryside and/or by people with relatively lower income than the average," he added.

Regarding the economic impact on the oil and gas industry, Devaux believes the decisions on the oil and gas industry should not be significant since France imports diesel to meet its domestic demand. "In the short term it will reduce the energy import bill, which is a positive consequence," Devaux pointed out. El-Ghamrawy echoed Devaux by saying: "Following this vision of depending on renewable energy, will reduce the burden of importing fossil fuel from the French public budget. This will help the government to allocate this money to improve the living standards of its citizens. That's why other countries should follow the same steps."

Over the past years, many countries started to reduce their hydrocarbon consumption. In June 2015, the leaders of the biggest seven economies in the world (G7) - Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States - agreed to cut greenhouse gases by phasing out the use of fossil fuels by the end of the century.

In addition, several European countries started to reduce the use of diesel and gasoline fuelled cars. In 2016, 3.6% of new registered cars in Western Europe were hybrid and electric. Car manufactures themselves started to adopt their plans to follow this global environmental trend. In July 2017, Volvo announced that all its cars will be completely or partially electric or hybrid starting from 2019, making Volvo the first big vehicles manufacturer which takes this step.

Even significant oil producing countries started to adopt strategies to become more oil independent. Despite of being the world's 8th top oil producer (3,721 thousand barrels per day in 2017) and possessing the world's seventh largest oil reserves (98 billion barrels), the United Arab Emirates (UAE) recently set ending oil dependency as a main goal.

El-Ghamrawy believes that some other main oil producing countries in the Middle East, such as Iraq and Saudi Arabia, might not be fully supportive of the idea of finding alternatives to oil and gas. He thinks that they should revisit this perspective in order to build their economy on more reliable unlimited sources. From his side, Devaux expects France to issue more green laws, such as ending the circulation of old vehicles in big cities, which are already not allowed in Paris.

OVERVIEW OF THE MEDITERRANEAN RESERVES

By Omnia Farrag

In the recent years, the Mediterranean region has witnessed important hydrocarbon discoveries beneath its waters. These discoveries, in addition to the already existing reserves, are valuable assets for the region's economy and unlock significant prospects between the Mediterranean countries in terms of energy cooperation.

Egypt

Egypt has more than 40 producing natural gas wells off the Mediterranean producing 0,781 trillion cubic feet (tcf) of natural gas and 7,606 million barrels of condensates. The recently discovered Zohr field is, so far, the largest gas field in the Mediterranean, with reserves estimated at 30 tcf. The giant gas field is expected to increase Egypt's natural gas output by 50% in 2018 and 100% in 2020, according to the Egyptian Ministry of Petroleum. In December 2017, the field started output with daily production of 350 million cubic feet (mcf). This daily output is expected to increase to between 1.8 bcf/d and 2 bcf/d by the end of 2018, and then raise to 2.9 bcf/d by mid-2019.

In February, another gas field, Atoll, off the Egyptian Mediterranean shore started production. Atoll is located in the North Damietta concession in the East Nile Delta. Phase one of the project is now producing 350 mcf/d and 10,000 barrels per day (b/d) of condensate. Gas production from the field is directed to Egypt's national grid. The main reservoir in the field possesses an estimated 1.5 tcf of gas and 31 million barrels of condensates.

The West Nile Delta is also a promising area in regards to Egypt's offshore reserves. The operators of the fields, British Petroleum and DEA, expect to develop 5 tcf of gas and 55 million barrels of condensate reserves from phase one of the project. The existing undeveloped fields and future exploration activities are expected to further boost the production of the project by an additional 5 tcf to 7 tcf.

Noroos gas field, off the Egyptian Mediterranean shores, is another record-breaking field. It produces 32 million cubic meters per day (mcm/d), as per Eni's recent announcement in March 2018. Eni described this production level as "the highest ever recorded by an Eni field in Egypt in the last 50 years". The Italian company further added that production from Norros will increase to 34 mcm/d by June 2018 after drilling additional 14 wells.

Libya

With 48.4 billion barrels of proven reserves, Libya has the largest oil reserves in Africa and the tenth largest globally, based on the European Union's statistics. It has the fifth largest natural gas reserves in Africa estimated with 53.00 tcf, according to Knoema. Its oil and gas production witnessed fluctuation since the 2011 revolution and the overthrow of the head of the state, Muammar Gaddafi. As per Energy Information Administration, Libya was producing about 1.65 million barrels per day (mb/d) of crude oil and 594 bcf of natural gas in 2011. However, the most recent statistics from Konema shows that Libya produced around 974,000 b/d during Q3 2017, and 592 bcf in 2015.

As for its Mediterranean reserves, Libya's Bouri field, discovered in 1975, is believed to be the largest oil field in production in the Mediterranean. It has 4.5 billion barrels of proven crude oil reserves and 3.5 tcf of natural gas. Al Jurf is another main field in the Libyan Mediterranean territory. It consists of the BD-1 wellhead platform with 10 production wells connected to a floating production storage offloading (FPSO) vessel. Al Jurf's production is expected to reach 40,000 b/d.

Algeria

Algeria has 48 billion barrels of oil reserves and 53 tcf of natural gas reserves. Its oil production reached 994,000 b/d in 2017, while the most updated data about its natural gas production was 91.3 bcm/d during 2016. Most of the Algerian reserves are onshore; however, recent seismic scans have revealed potential oil reserves off the eastern coast of the city of Bejaia and the western port of Oran, as Investopedia wrote. The African country had planned to drill its first offshore well by the end of 2015; however, no explorations were announced. It currently discusses with ExxonMobil and other companies to start offshore drilling.

Cyprus

International Oil Companies (IOCs) have recently started to give Cyprus special attention, as there are two main recent gas discoveries in the Cypriot Mediterranean territory. In December 2011, Noble Energy announced the discovery of the Aphrodite field, with reserves estimated at around 4.5 tcf and production capacity expected to reach 800 mcf/d, according to Delek Drilling Website.

In February 2018, Eni announced the discovery of the Calypso gas field in Block 6 of the Cypriot exclusive economic zone (EZZ), 80 kilometers away from Egypt's Zohr. Although the Italian company did not announce officially the capacity of Calypso, Eni described the field as a "Zohr-like" one, with the same geographic characteristics. Calypso holds 170-230 bcm of natural gas, Nasdaq wrote reporting from the Israel-based website Globes. Since 2013, Eni has licenses to explore hydrocodone reserves in Blocks 2, 3, 6, 8, 9, and 11 of Cyprus' economic zones, which means that there is a potential to see more hydrocarbon discoveries off the Cypriot Mediterranean shores.

Israel

Israel's proven reserves are around 12,730 thousands barrels of oil and 6,216 bcf of natural gas according to Oil & Gas Journal's statistics of January 2018. Israel's first offshore exploration well was drilled in 1970 with focus on shallow-water exploration until 1990s, further expanding to its entire EEZ.

As of 2016, 60 exploration and production wells were drilled in the Levant Basin offshore Israel, according to the Israeli Ministry of Energy. Noa well was the first gas discovery off the Israeli shores (1999) with reserves of 1.3 bcm. In 2000, Meri-B well was discovered with also 1.3 bcm of gas reserves, Reuters wrote. In the following years, many other natural gas fields were discovered off the Israeli Mediterranean shores including Leviathan, Tamar, Karish, Tanian, Dolphin, and Dalit.

Leviathan field is the largest gas field off the Israeli Mediterranean shores with estimated reserves of 18 tcf of natural gas and 600 million barrels of oil beneath the gas layer, according to Offshore Energy Website. The field was discovered in 2010 and its development plan was approved by the Israeli government in 2016, indicating that the gas of the Leviathan will be available in the market in 2019, as writers reported. Israel plans to drill four production wells in Leviathan field, which will produce 12 bcf of gas annually, double of the volume of gas available to the Israeli market.

Tamar natural gas filed is Israel's only commercial

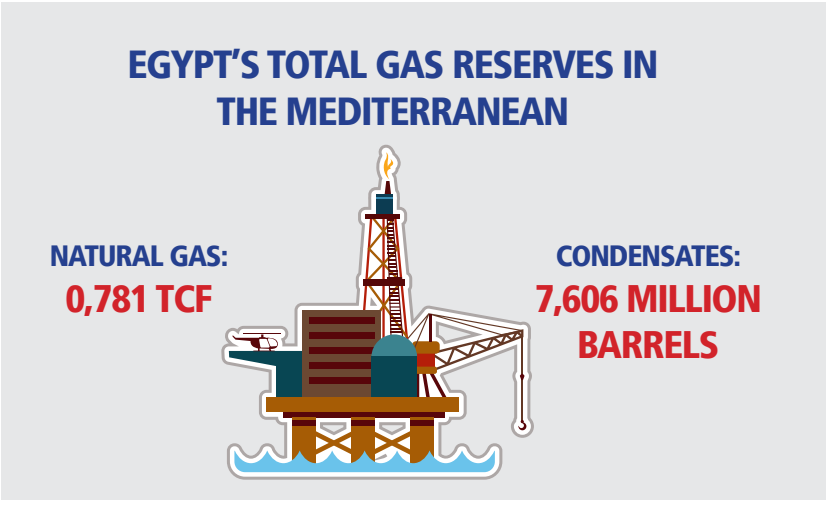
natural gas field. It provides the majority of Israel's power generation, in addition to exporting to Jordan. It was discovered in January 2009, began production in April 2013, and reached its full production capacity in July 2013. It produced about 4.9 bcm of gas in the first half of 2017, Reuters reported. Its reserves' estimate was 5 tcf, further increasing to 6.3 tcf after the drilling of the second appraisal well Tamar-2. By 2013, Tamar's reserves estimated reserves increased to 10 tcf, according to Offchore Technology.

Karish and Tanian natural gas fields are located next to Tamar field. Energean Israel, which owns 100% of both field, wrote in its website that the reserves of the two fields combined are around 2.4 tcf of natural gas and 33 million barrels of light hydrocarbon liquids; however, several news outlets reported that Energean Israel's plan for the fields indicates that the reserves are 2.7 tcf of natural gas and 41 million barrels of oil equivalent of light hydrocarbon liquids. Karish is planned to produce 400 mcf/d out of the three wells that Energean Israel plans to drill in the field.

Dalit gas fied was discovered in April 2009 with 500 bcf of natural gas reserves, according to Hebrew Energy. Its flow rate recorded 33 mcf/d and its production rate is estimated to be 200 mcf/d. Dolphin gas field was discovered in 2011, 30 km northwest of the Leviathan site and 110 km west of Haifa. It has 81.3 bcf of natural gas, as Platts Website wrote.

Lebanon

Lebanon's offshore reserves are estimated to be between 440 and 675 million barrels of crude and between 96 tcf of natural gas reserves, potentially worth a combined $300bn-$600 billion, according to Financial Times. Until today, it does not have offshore oil and gas fields off the Mediterranean; however, it is worth mentioning that it signed its first offshore oil and gas exploration and production agreements on February 9, 2018. The agreement was signed by the Lebanese government on one hand, and a consortium of France's Total, Italy's Eni, and Russia's Novatek on the other hand to start exploration in blocks 4 and 9 of the Lebanese Mediterranean waters. The first exploratory well will be drilled in block 4 in 2019, while the time frame of operations in bock 9 is still not announced. Lebanon is currently offering three more blocks of its water territory for exploration tender.



Malta

Malta has long history of trying to explore hydrocarbon reserves off its shores; 30 wells were drilled in the past 60 years without any discoveries. Nonetheless, the Maltese government has offered blocks 1, 2, and 3 of Area 3, which is located 6,000 square km north of the island in September 2017, for exploration and production license, as Times of Malta reported.

Syria

Syria's reserves are estimated to be 2,500,000 thousand barrels of crude and 8,500 bcf of natural gas. Two hundred and thirty bcm of these natural gas reserves are offshore, besides 170 bcm of additional potential reserves, according to USGS estimates. There is no near future plans to extract these reserves due to the current civil war in Syria that has been going on since 2011. In December 2013, Russia signed a deal with the Syrian government to explore the reserves in the Syrian EEZ; yet, the former pulled out from the deal because of the war.

Palestine

Gaza has two natural gas fields discovered in 2000. The main field, called Gaza Marine, is located 36 km west of Gaza City, while the second smaller one straddles the international boundary separating Gaza's territorial waters from Israel's territorial waters. The studies of British Gas Group (BG Group), which discovered the fields, expect the two fields to have 1 tcf of natural gas, while the study of Consolidated Contractors Limited, which is responsible for the development of the fields along with BG Group and the Palestine Investment Fund, estimate the wells to have 1.4 tcf of natural gas.

SAHARA OIL & GAS COMPANY (SOG), HISTORY & SUCCESS STORY

Sahara Oil & Gas Company (SOG) is one of Sahara for Projects and Investment Company (SPIC) entities. It is specialized in upstream (E&P) activities. The Company started under Sapesco umbrella in 1998 as new business line to invest in the E&P activities. It was established and registered officially under the name of SOG in year 2004 to explore and exploit oil and gas in Egypt's different areas. Since the Company's establishment, its objective and mission were to acquire a portfolio of concessions and use its experienced staff and other tools to achieve the maximum success and returns for the benefit of the shareholders, considering the importance of HSE in all the operation.

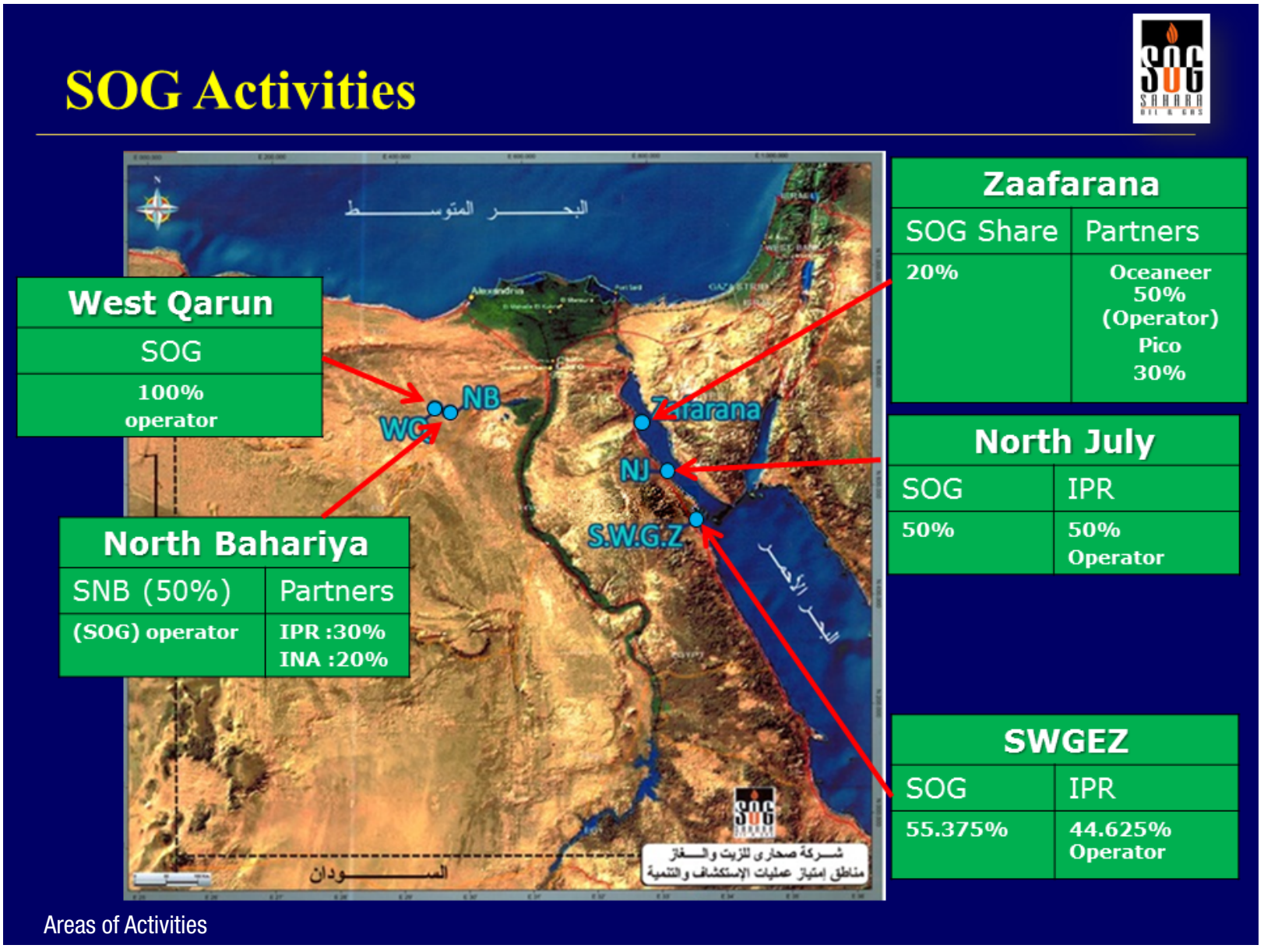
AREAS OF ACTIVITIES

Currently the Company has shareholding in four concessions (100% contractor share in West Qarun, 50% contractor share in North July, 55.4% contractor share in SWGEZ, and 20% contractor share in Zaafarana). The Company is the operator of West Qarun, while the other concessions are operated by other partners (IPR in Fanar & SWGEZ, Pico in Zaafarana), in addition to taking the responsibility of the operator SNB in North Bahariya Concession.

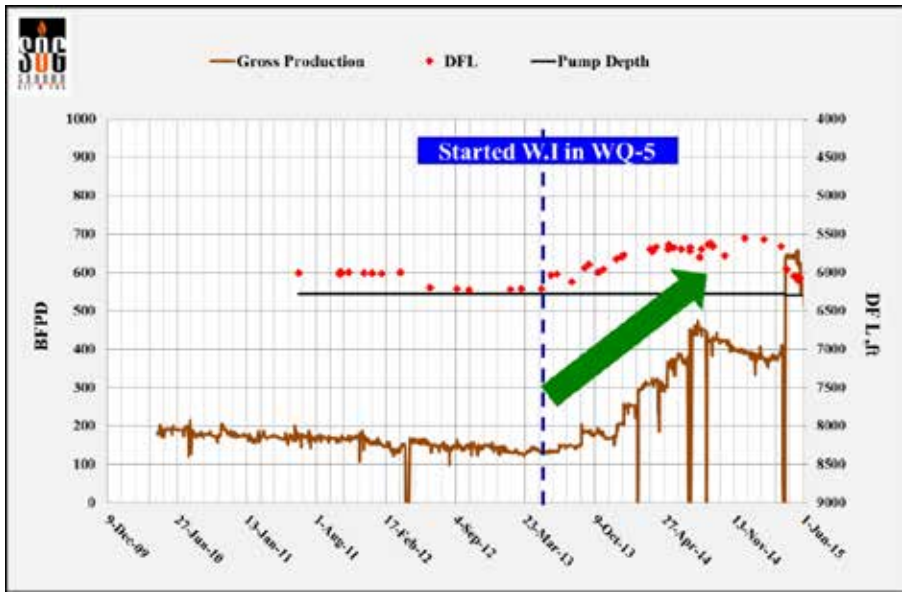
MANAGEMENT & STAFF CAPABILITIES

The managerial staff of the Company has long and wide experience in upstream work of the Petroleum Sector Companies either in management or in technical and other aspects. Additionally, the under staff has enough experience in all the related work disciplines (including Geological and Geophysical data interpretation and studies; Petrophysical data analysis; reservoir characterization; integrated reservoir studies, including simulation ones; development plans preparation; reservoir management; wells drilling and workover programs preparation; maximizing wells deliverability; artificial wells design; implementing secondary and tertiary recovery projects; surface facilities design and de-bottle necking; planning and follow up; budgets preparation; and Economics evaluation studies). The staff is kept trained and updated with the latest technology to improve the operation performance considering the positive economics results to avoid wasting the expenditures.

ENG. ALI MIRA
President & CEO Sahara Oil & Gas



Areas of Activities



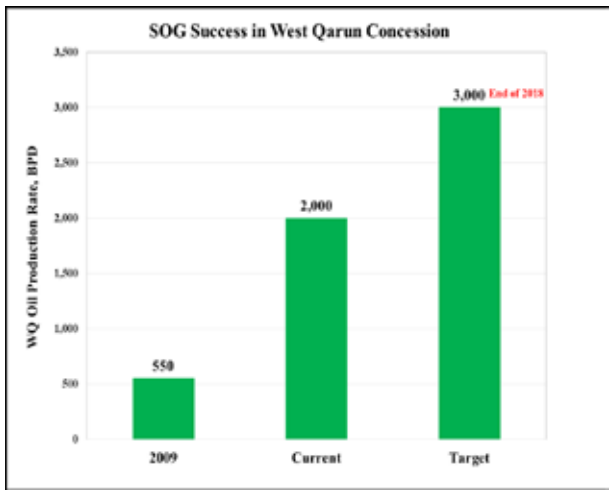
Well WQ-3 Production Performance With Water Injection

COMPANY SUCCESS IN OPERATED AREAS

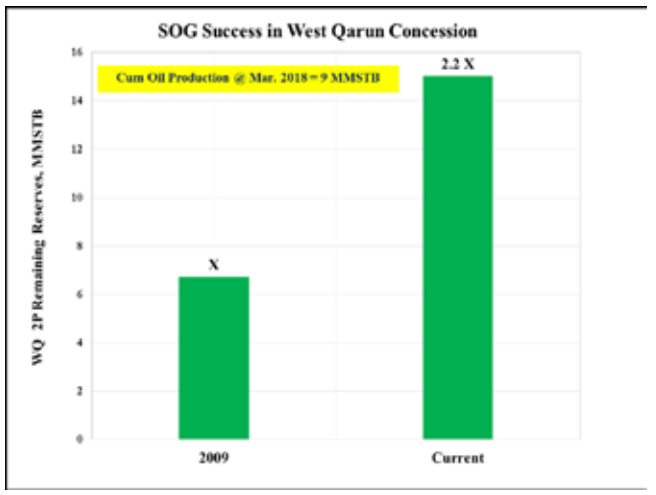
In the concession areas where the Company is the operator (West Qarun & North Bahariya), it succeeded to comply with HSE requirements and apply the latest technology in the operations, which reflected positively on the reserves and production of both concessions.

After getting the renewal of the West Qarun Concession, the Company started immediately implementing the obligations of the new agreement offered as justification to Authorities for approval to spend 30 million dollars Capex, other than Opex, on two stages for drilling development and injector wells, supply water wells, and construction of new water injection and treatment facilities projects. The work is undergoing and it will keep the production of the Concessions always growing.

Meanwhile, in NB Concession, the development of the Concession fields is seriously undergoing, including development and water injection wells drilling, in addition to treatment facilities project, and it will help to increase the Concession fields production always growing.



WQ Production Rate Comparison



WQ 2P Remaining Reserves Comparison

With regard to the non-operated Concessions, Zaafarana Concession, located in the Gulf of Suez and operated by Pico, has production potential close to 4,000 barrels of oil per day (b/d). The Concession renewal is in the approval process and expected to be secured soon to start implementing the renewal obligation to complete the development and continue increasing its production.

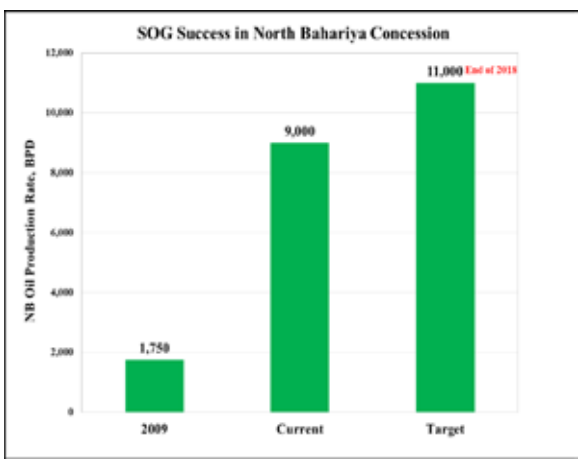
The other two Concessions are marginal operated by IPR, located in the Gulf of Suez, and the production potential of North July is around 500 b/d, while the SWGEZ potential is around 100 b/d. The workover to increase its productivity is currently under study.

WORK FACILITIES

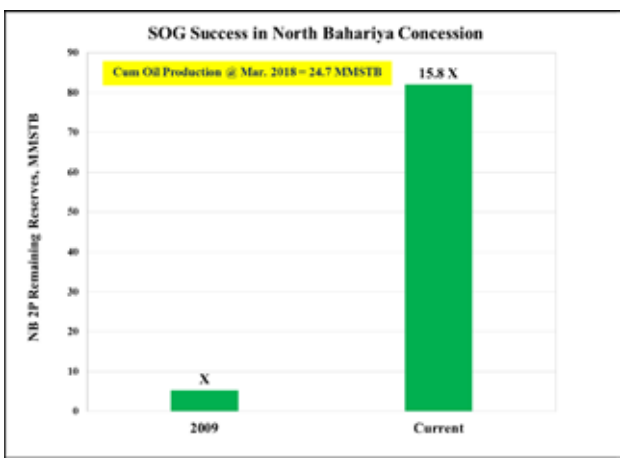
The office of the Company was well chosen to provide a comfortable work atmosphere for the employees and equipped with the best-chosen hardware and software tools to secure the best outcome in terms of design or data analysis. The used softwares in company work are Geographic's for Exploration; Petrel, OFM, and Eclipse for Operations; Peep for Economics Evaluation, and Comsys for Finance.

COMPANY FUTURE STRATEGY

As its future strategy, the Company aims to continue to focus relentlessly on safety, reliability, and systematic management of risk. It further looks at assuring the quality execution of its operations, reservoir management, and projects, considering the greatest sense of value and return while keeping growing value of its assets through increasing its reserves and cost optimization. Furthermore, the Company aims to always continue increasing the capability of its staff (management and under), as well as its work facilities, in addition to focusing on having new opportunities - either new Concessions or management and operations - on behalf of the others in their Concessions, local or abroad, to repeat the success story achieved, especially in the operated Concessions (West Qarun & North Bahariya).



NB Production Rate Comparison



NB 2P Remaining Reserves Comparison

EGYPT IS WORKING TOWARDS ACHIEVING ITS GOAL OF BECOMING A REGIONAL ENERGY HUB

The recent discoveries of large natural gas reserves in Egyptian, Israeli and Cypriot waters, coupled with Egypt's unique geography and existing liquefaction facilities, mean that the country is well-positioned to become a regional energy hub over the coming years.

This has motivated Egyptian policymakers to build on the country's existing role as one of the most important trading hubs in the region, and to inaugurate a new large-scale LNG wharf for natural gas and petroleum product tankers on the Gulf of Suez.

Egyptian President Abdel Fattah El Sisi's government has announced the hub as part of its energy policy to establish Egypt as the cheapest place for its neighbors to send their gas supplies abroad. However, the lack of a political framework between all these countries may still create complicated legal and logistical problems. Given that Shell operates Egypt's Idku plant and owns a 35% stake in the Aphrodite field it is probable that a deal will involve selling natural gas to Idku.

Moreover there's currently a lot of exploration activities going on in Cypriot waters and all gas discoveries will be looking for an export route. This explains Sisi's trip to Cyprus in November 2017 where he discussed the construction of a pipeline to deliver gas from Aphrodite to Egypt.

Israel also now has a natural gas surplus and is hoping to profit by selling the excess abroad. Jordan has already signed a deal to buy some and the rest was planned to be sent to Europe as an alternative to Russian supplies, however geography and politics make that difficult.

Israel must choose between two different scenarios: 1) Export gas to Egypt, discharge the gas at Idku and Damietta and ship it to Europe and Asia. 2) Build a new undersea pipeline through the Mediterranean that would bypass Sinai and export to Greece.

Last year, Sisi signed a law that allows private companies to buy gas from any country in the region. Following this, a delegation representing Israel's Tamar gas field came to Cairo to discuss sending gas from Tamar and Leviathan to Egypt. As a part of the arbitration resolution with the Israeli consortium, the lead partners in Israel's largest gas fields proposed supplying around 64 billion cubic meters of natural gas worth $15 billion over 10 years to Egyptian company Dolphinus Holdings starting in 2020.

It has become obvious that there are no other viable export routes for gas from Israel's Leviathan or Cyprus's Aphrodite. Alternative routes such as direct pipelines to Turkey, Greece or Italy could be prohibitively expensive because of the depth of the seabed. Egypt, with its strategic location bridging the land between Asia and Africa and its well-developed infrastructure will help turn it into a trading and distribution center for natural gas and crude oil.

Mohamed El Haythem, Mphil, DBA, MBA, PMP

General Manager, Foreign Companies' Control at EGPC

R-FACTOR AND ROR-BASED fiSCAL SYSTEMS

Oil and gas producing countries compete with each other to attract foreign investment to develop their natural resources. To achieve this objective, they must evaluate their position in the global marketplace and assess their fiscal regime. In evaluating options to encourage oil exploration and production activities, host governments should focus on reducing the investment risk.

Depending on its overall fiscal policy needs, the host government may seek different levels of front-loading at different points in time. In order to achieve its objectives while maintaining a reasonable level of investment incentives, the government would need to seek a tradeoff between regressive features (royalties, cost recovery limits and exploration tax) and progressive features (RoR, R-Factor-based taxes or production sharing).

One of the key challenges of fiscal policy is develop a system that is able to allocate risks equitably. To meet this challenge, policy makers need to take into account the divergent interests of companies and governments. As risks can differ substantially for different projects and countries and over time, a fiscal regime that provides optimal outcomes under all circumstances is not likely to be developed. Although this may justify a case-by-case approach, this would not be efficient given the usually large number of projects and the often limited administrative capacity of the host government. It is therefore desirable to build enough flexibility into a system to allow for automatic adjustments to unforeseen changes and to minimize the need and cost of negotiations and/or renegotiations. Many petroleum fiscal systems around the world exhibit some form of flexibility. Very few of them effectively and efficiently target the economic rent, i.e. are neutral to investment decisions. Fiscal systems that use sliding scales based on daily or cumulative production targets are insensitive to changes in prices and costs. Therefore, in a dynamic environment such as the oil industry, these systems are more likely to produce a misalignment of interests between the host government and the investors, as the recent surge in contract renegotiations suggests. On the other hand, these systems are relatively easy to administer and may prove reasonably efficient in sharing the rent between the contractor and the government when project uncertainty is low, especially if used in conjunction with price indices. R-Factor and RoR-based fiscal systems lower the project's specific risk by introducing flexibility in the fiscal package to suit the profitability of the particular project. Because of their flexibility, these types of arrangement are more likely to encourage the development of marginal fields, or of complex projects with a long lead-time for implementation. In addition, the use of R-factor and RoR-based systems normally lowers the break-even price of a project. This in turn makes these projects more attractive to the contractors and less risky as candidates for project financing. The choice of trigger rates and thresholds is a key issue for all fiscal systems.

The investment attraction team in the Modernization Program can use these types of systems in developing mature fields in Egypt or apply it in gas pricing proposals.

Hany Shaker Hashem

Assistant General Manager for Feasibility Studies&Projects Evaluation at EGPC

NATURAL GAS HYDRATE: GAME CHANGER OR FICTIONAL TENDER?

The world has witnessed the gas hydrate as a flow assurance issue. On the other side, a crystalline material, which is composed of water and gas in a cage-like lattice, exists in huge amounts away from the surface where it is too cold and pressurized. Of course, we mean here the permafrost, ocean floors, and hydrate-bearing sands. According to Arthur H. Johnson's study to calculate the gas in place in hydrate-bearing sands, he found out that the total median equals 43,311 tcf. This value is nearly seven times the conventional natural gas reserves. Here, we have one of the most difficult unconventional resources to be recovered, as illustrated by Stephen Holditch's resource triangle for natural gas. USGS reported that one cubic meter of methane hydrate brought up from the sea floor yields 163 cubic meters at standard conditions.

The rising potential of natural gas hydrate pushes all of us to do unprecedented work and studies in order to enable the world to exploit such a resource. The current recovery techniques are depressurization, thermal, and chemical recovery. Each technique has its own drawbacks which hurdle the way against the economic and safe recovery. Moreover, methane hydrate exhibits challenges in safety, geomechanics, production, and logistics. However, it is a promising resource to provide a clean and abundant source of energy for the upcoming generations.

The research is always the key element to meet the global need and solve the challenges to turn out methane hydrate into a game changer in the near future. It may be through novel approaches or innovative technologies which can create a booming business just for methane hydrate. The economic feasibility of such a resource is directly related to how innovative and simple the recovery technique is.

OSAMA RADWAN

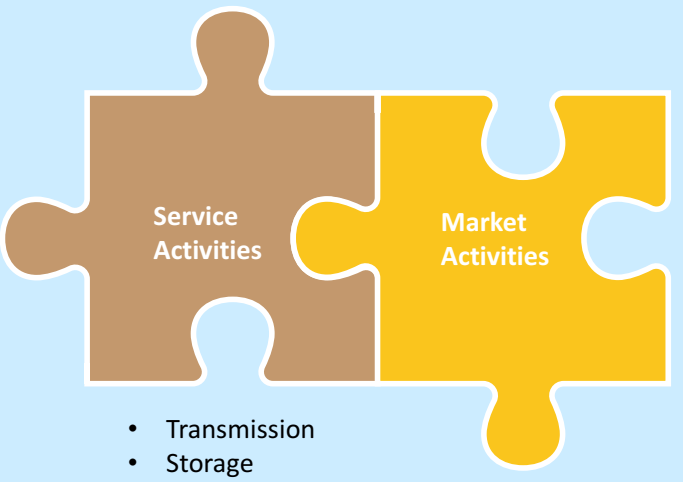
Research Student, Faculty of Petroleum and Mining Engineering at Suez University

Economic Snapshot: Egypt's New Gas Market Law

In August 2017, the President ratified a new law to liberalize the downstream and midstream segments of the natural gas market, in a move to help fuel growth and investment, by allowing private companies to trade competitively in the gas market.

Establishing a Gas Market Regulatory Authority

Gas Market Activities



- Transmission
- Storage
- Distribution
- Liquefaction
- Shipping
- Supply

Gas Market Participants

Transmission System Operators

A license can be granted to TSOs to operate the national gas high pressure pipelines grid system.

Distribution System Operators

This includes the medium and low pressure gas pipelines from gas entering points to the delivery point to consumers.

Regasification Facilities Operators

A license can be given to companies to operate national regasification facilities for a tariff.

Storage Facilities Operators

These include underground and over- ground containers and warehouses of gas in gaseous, compressed or liquefied states.

Gas Shippers

Gas shippers are entitled to use gas grids and facilities for a tariff. They are also allowed to buy, sell or import gas.

Gas Suppliers

Gas suppliers are those licensed to buy gas from shippers and sell it to end customers or other suppliers.

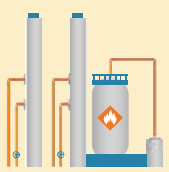
Qualified Consumers

Those entitled to choose their own gas suppliers through direct agreements specifying gas prices and quantities.

Expected Benefits

Securing Multiple Gas Sources

The law helps in securing a variety of sources of natural gas supply, including private sector companies, in addition to encouraging investments.

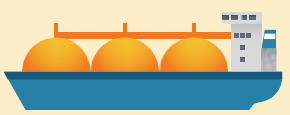


Benefiting from Idle Factories

Idku and Damietta LNG liquefaction terminals have been unable to run at capacity since 2008 as a chronic shortage of gas has directed supplies to domestic usage rather than for export.

Providing a Source of Revenue to GoE

The law provides for the first time a return to the Ministry of Petroleum, through EGAS and GASCO, for the usage of the natural gas network.



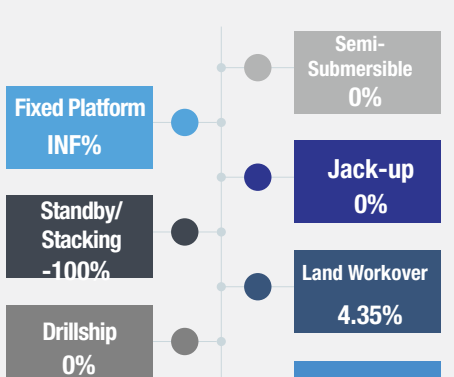
Transforming Egypt into an Energy Hub

In addition to recent gas discoveries; Egypt is considered a major player in the regional gas trade, because of the Arab Gas Pipeline; an international pipeline from Egypt to Turkey to Europe's markets.

Rigs per Specification

Date	Land-Drilling	Land Workover	Jack-Up	Semi Submersible	Fixed Platform	Standby/ Stacking	Drillship	Total
Jun-17	45	40	11	1	1	49	2	149
Jul-17	45	37	11	1	1	52	2	149
Aug-17	42	37	11	1	1	55	2	149
Sep-17	39	40	10	1	0	56	2	149
Oct-17	41	43	10	1	1	50	2	148
Nov-17	41	45	10	1	1	49	2	149
Dec-17	41	47	11	1	1	46	2	149
Jan-17	46	46	11	1	0	43	2	149
Feb-17	46	48	11	1	1	0	2	109

M.O.M CHANGE IN RIG COUNT PER SPECIFICATION

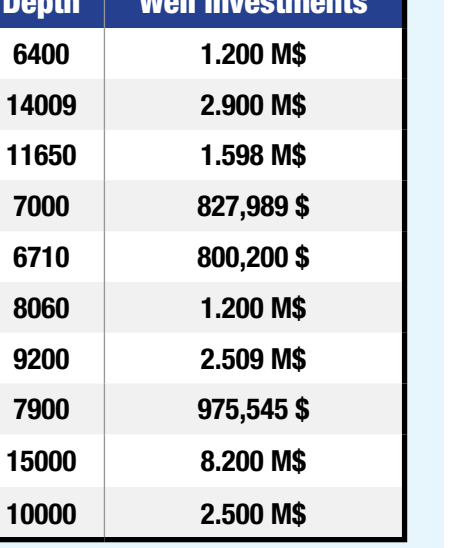


MoM calculations are for Jan & Feb figures.

Rigs per Area

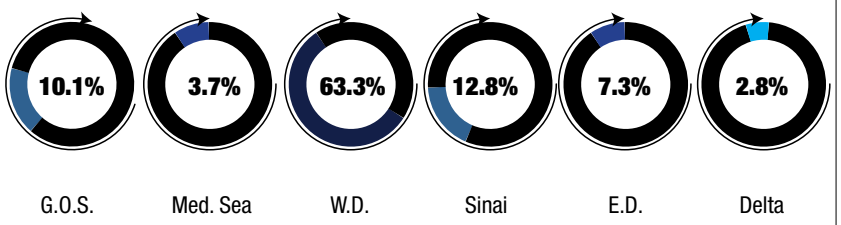
Month	G.O.S.	Med. Sea	W.D.	Sinai	E.D.	Delta	Total
Jun-17	9	6	61	13	6	5	100
Jul-17	9	6	59	14	6	3	97
Aug-17	9	5	59	13	5	3	94
Sep-17	9	5	61	11	5	2	93
Oct-17	10	4	64	12	6	2	98
Nov-17	10	4	63	13	7	3	100
Dec-17	11	4	65	14	6	3	103
Jan-17	10	4	68	13	8	3	106
Feb-17	11	4	69	14	8	3	109

M.O.M CHANGE IN RIG COUNT PER AREA



MoM calculations are for Jan & Feb figures.

Distribution of Rigs - February 2018



PRODUCTION Q4 2017

	Crude Oil	Equivalent Gas	Liquified Gas	Condensate
Mediterranean Sea	0,015,000	13,039,060	73,018	809,016
Eastern Desert	1,660,000	--	--	--
Western Desert	8,700,000	6,571,443	36,800	1,112,493
Gulf of Suez	3,380,000	588,625	3,296	68,117
Delta	0,020,000	6,577,370	36,833	412,436
Sinai	1,340,000	589	3	14,737
Upper Egypt	0,005,000	--	--	--
Total	15,080,000 barrels	26,777,084 barrels	149,950 cubic feet	2,416,799 barrels

Unit: Barrel

*Natural Gas figures are in Boe. *Crude total excludes Upper Egypt production

DRILLING UPDATES

Region	Company	Well	Well Type	Rig	Depth	Well Investments
Western Desert	KHALDA	WRZK-178	Development	EDC-61	6400	1.200 M$
	KHALDA	MUNTAGA SE1X	EXP	ST-4	14009	2.900 M$
	KHALDA	W.KAL A-21	W.Inj	EDC-11	11650	1.598 M$
	QARUN	WON X-13	Development	EDC-63	7000	827,989 $
	QARUN	SHKRAS-1X	EXP	EDC-65	6710	800,200 $
	NORPETCO	GANNA W-3	Development	ECDC-2	8060	1.200 M$
	AGIBA	ROSA N-2	Development	PDI-104	9200	2.509 M$
	PETROSILAH	ABOUD 1-1	EXP	ECDC-1	7900	975,545 $
DELTA	PETROBEL	NIDOCO W.7	Development	EDC-59	15000	8.200 M$
SINAI	PETROBEL	BEL.BAY-5 ST.1	Development	WF-797	10000	2.500 M$

*DRILLING is for February 2018.

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