

EGYPT OIL & GAS NEWSPAPER

TRACKING THE GENDER GAP IN EGYPT'S PETROLEUM SECTOR: **FROM ACADEMIA TO FIELD**

EXCLUSIVE INTERVIEW

The Art of Reviving Mature Fields,
an Interview with **DAVE THOMAS**,
Cheiron's CEO



REPORT IN PRINT

THE ECONOMICS OF PETROLEUM TRANSPORTATION:

Egypt's Performance in 2016/2017

STUDENT ACTIVITIES & EDUCATION IMPROVEMENT:

The Silver Lining for Governmental Petroleum
Engineering Students

WORKING ON THE RIGS

Through the Eyes of Junior Field Engineers

INITIATIVES, NGOS FOR WOMEN IN ENERGY: Role Models from Abroad



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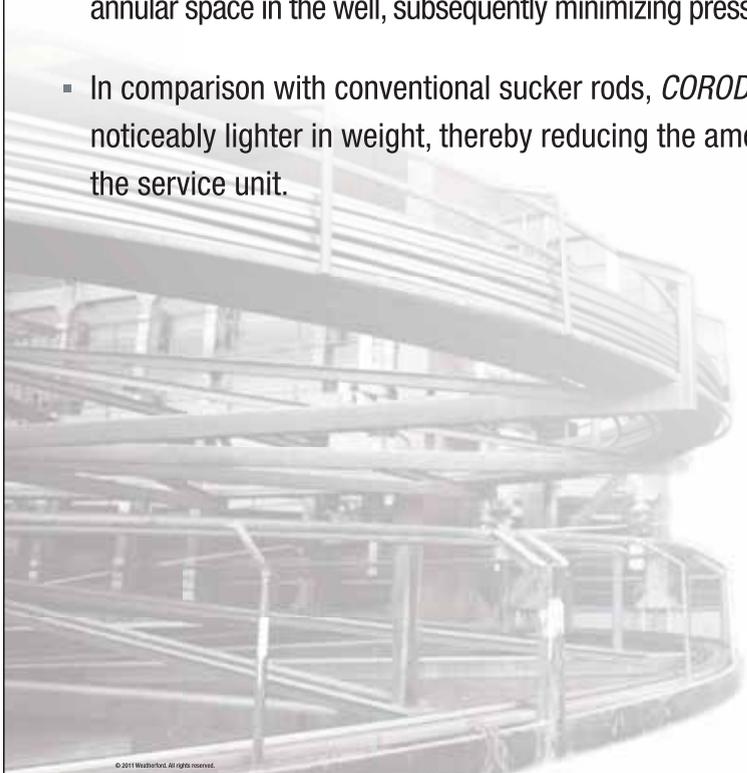
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- Description of the proposed paper summarizing the scope of business upon which the paper will be based

ABSTRACT CONTENT

- June 30, 2018 – Abstract submission
- July 15, 2018 – Notification of acceptance
- September 1, 2018 – Presentation submission

ABSTRACT CONDITIONS:

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- Should avoid commercialisation
- Must be written in English
- Should be submitted in electronic format and be a maximum of 500 words

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EDITOR'S NOTE

The game changing potential of human resources has led the petroleum industry to pay special attention to the optimization of its employees. Under the umbrella of the Ministry of Petroleum and Mineral Resources' Modernization Program, addressing gender disparity in the petroleum sector and enhancing the skills and participation of young professionals have become a key strategy to boost the industry's performance. In order to highlight the main aspects of this people development strategy, Egypt Oil & Gas has dedicated this issue to an in-focus look into women in energy and youth in the oil and gas sector.

In our exclusive interview with Dave Thomas, Cheiron's CEO, we bring important insights on reserves recovery of mature fields. Dave commented on Cheiron's operations and future projects in its Egyptian fields, as well as his views on Egypt's market environment and the company's vision on young professionals' skills. You can further find in this issue a report on the economics of petroleum products' transportation in Egypt during the fiscal year 2016/2017, which was based on data

provided by CAPMAS.

Additionally, you can find in this issue relevant statistics concerning the female participation in the energy sector in Egypt and worldwide, as well as experts' insights on how to solve gender disparity in national and international oil companies. Still on female participation, we further provide a compilation of international initiatives and NGO's that successfully promote the role of women in energy. Egypt Oil & Gas contacted these organizations in order to provide our readers with valuable examples that can be applied in the national industry.

Moving forward to the topics concerning young professionals' skills and opportunities in the petroleum sector, this issue brings an outlook of the difficulties faced by junior petroleum engineers when facing the market. You can have access to junior field engineers' views on the working conditions in the rigs, as well as petroleum engineering students' comments on their academic studies and measures to improve their skills and join the oil and gas workforce. Moreover, you can

understand the role of the private sector in promoting courses and training to the new generation of petroleum engineers.

You can further find in this issue updated information about the 9b development project in the West Delta Deep Marine concession, in addition to the coverage of the International Gas Union (IGU) Executive Committee meeting that took place in Cairo with the honorable participation of the Egyptian Minister of Petroleum, H.E. Eng. Tarek El Molla. Furthermore, we bring the topics discussed at Egypt Oil & Gas Technical Committee meeting, with highlights on the 2nd Upstream Operational Excellence Convention.

As always, thank you for your readership and support. We fully enjoyed preparing this issue.

EDITOR IN CHIEF



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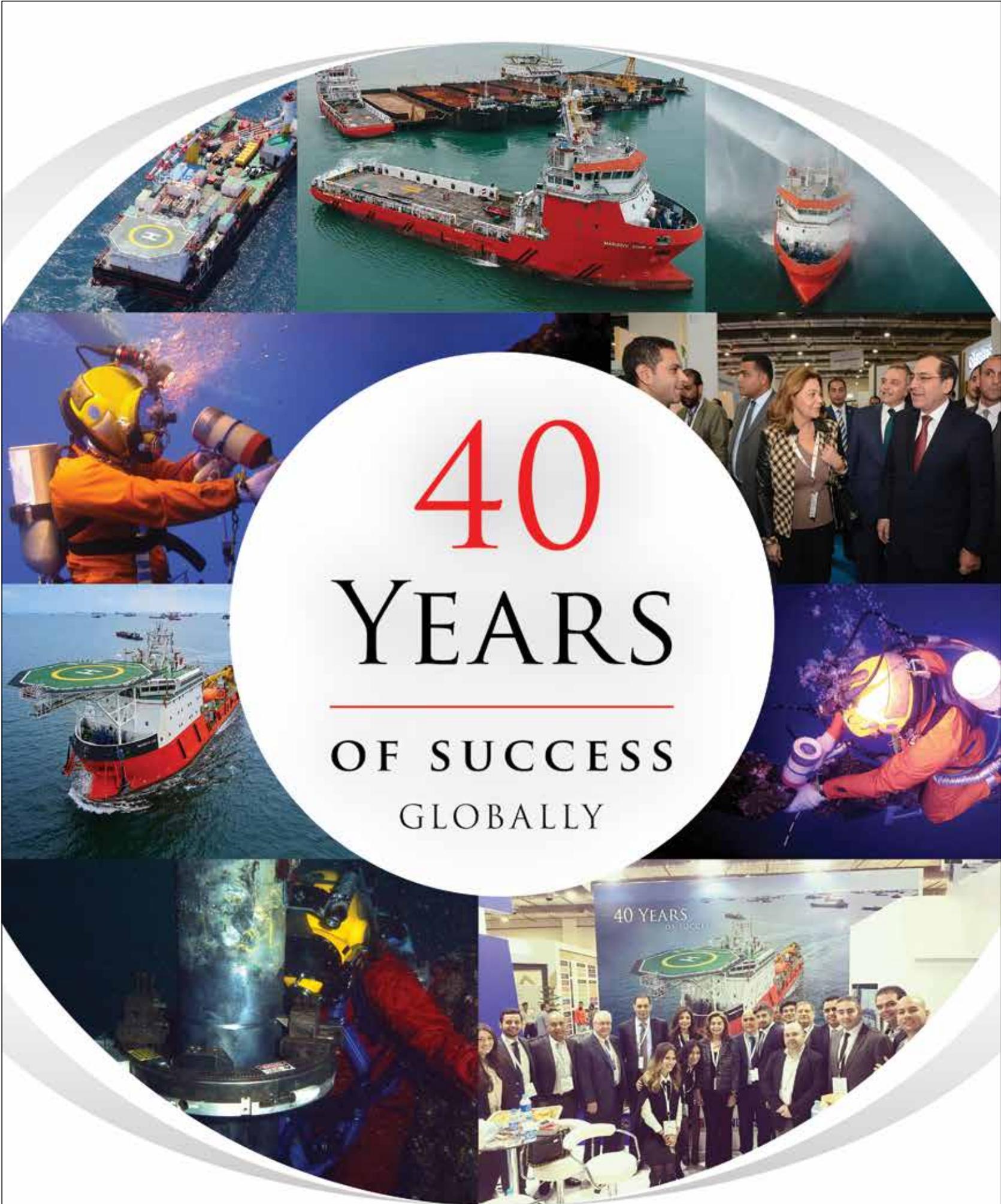
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Egypt Pumps 250,000 Butane Cylinders per Week

The Egyptian General Petroleum Corporation (EGPC) recently succeeded in pumping 250,000 butane cylinders during the past week to cover the demands of the commercial and residential sectors across the country. Butane pumping rates peaked at 275,000 cylinders per week during winter, which were distributed via EGPC's warehouses

that will be decreased along with connecting households to the national natural gas grid, stated Abed Ezz El Regal, head of EGPC. The Egyptian oil and gas sector is distributing butane cylinders through 174 warehouses, which contribute directly to meeting most of Egyptian sectors' consumption of butane, Ezz El Regal pointed out.

Diesel Consumption Reaches Close to 275,000 tons per Week

The Egyptian local market consumed around 275,000 tons of diesel per week across the state sector, while the country's output reached 130,000 per week, head of the Egyptian General Petroleum Corporation (EGPC) Abed Ezz El Regal said. Domestic diesel production provides much of the fuel required by

electricity power plants and the public, Ezz El Regal stated. He highlighted that securing petroleum products and natural gas supplies is a strategic priority for the petroleum sector to cover the demands of different economic sectors and to play a part serving the objectives of sustainable economic development.

Cabinet Issues E&P Licenses

The Egyptian cabinet has issued a license to amend the exploration and production (E&P) agreement for the Ras Qattara Concession. The amendment, issued under the terms of Law number 4 for year 1989 and amended as per Law number 7 of year 1994, allows the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to contract with the Egyptian General

Petroleum Corporation (EGPC), the International Egyptian Oil Company (IEOC) B.V, and INA-Industrija nafte D.D. The cabinet also approved legislation to allow El Molla to contract with EGPC, Cheiron-Zaafarana Petroleum Company, Oceaneer Zaafarana, and Sahary for Oil and Gas to amend the E&P agreement for the North Zaafarana's Gulf of Suez concession development.

EDC Acquires 74% of Drilling Work in Egypt

The Egyptian Drilling Company (EDC) owns 74% of the offshore and onshore drilling market in Egypt, alongside performing 35% of well-repair activities, stated Salah Abdel Kerim, EDC's head. The company was able to optimize the operations of its drilling equipment and expand the company's client base, Abdel Kerim said during the EDC's general assembly. The company owns

40 drilling rigs, including 6 rigs operating in Saudi Arabia, as well as 4 offshore drilling equipment operating in Saudi Arabia, Bahrain and Egypt. Abdel Kerim explained that the company operates 3 marine vessels on behalf of the Egyptian General Petroleum Corporation (EGPC) and the Egyptian Natural Gas Holding Company (EGAS).

Egypt Gas Shareholders Approve Dividend Payouts

Egypt Gas's general assembly has authorized the company to pay out dividends of EGP 1 per share. The company said in a statement to the Egyptian Exchange (EGX) that it may pay the dividends in several installments, depending on the company's liquidity status at the time of payment. Egypt Gas submitted documents to the EGX a week

earlier to increase issued and paid-up capital from EGP 120 million to EGP 240 million. The company has a total of 24 million shares, with each share carrying a nominal value of EGP 10. The company's profits rose to EGP 25.6 million during the year ending last December, compared to EGP 24 million in 2016.

EGAS to Launch Natural Gas Exploration Outbidding

The Egyptian Natural Gas Holding Company (EGAS) plans to launch outbidding for the exploration of nine offshore and onshore natural gas concessions during Q2 2018, an official source has stated. EGAS obtained all the required security approvals for the bidding. The tendered concessions will include six offshore and three onshore ones. EGAS was planning to issue an

international outbidding to explore for crude oil and natural gas in 11 concession areas before June 2018, an EGAS official previously said. The bids' concessions would include eight offshore areas and three onshore concessions. EGAS obtained all required security approvals in order to issue the outbidding, the official noted.

Egypt to Receive Second Shipment of Iraqi Crude

Egypt will receive its second crude oil shipment from Iraq in two weeks, an official at the Egyptian General Petroleum Corporation stated. Egypt and Iraq activated a contract earlier in 2018 that will see Iraq ship 2 million barrels of crude oil from Basra every two months of the year with soft payment terms and a 90-day grace period. Iraq will supply Egypt

with a total of 12 million barrels over the year. Egypt received the first shipment in February 2018. This agreement comes within the framework of strengthening relations between the two countries and their keenness to expand the horizons of bilateral cooperation," Iraqi oil ministry spokesman Assem Jihad stated.

Petrojet Profits Exceed EGP 23B in 2017

The Petroleum Projects and Technical Consultations Company (Petrojet) recorded profits of EGP 23 billion during 2017, a 91% year-on-year increase, company head Waleed Lotfy has stated. Lotfy revealed the information during the general assembly chaired by the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the

company results for 2017. The company successfully completed 80 petroleum and national projects in the fields of natural gas production, infrastructure and development during in 2017, Lotfy said. These included early production from the Zohr natural gas field in Port Said and West Nile Delta in Alexandria to produce from Taurus and Libra fields.

UK Receives LNG Shipment from Egypt's Idku

The UK received a liquefied natural gas (LNG) shipment from Egypt's Shell-operated Idku liquefaction plant on April 8. Royal Dutch Shell hired the Maran Gas Apollonia to deliver the LNG cargo. The ship, owned by Maran Nakilat, successfully reached the Dragon LNG import facility located in Milford Haven.

Egypt turned into a net gas importer during 2016 because of the increased gas production from newly-discovered fields in the Mediterranean. Meanwhile, Egypt aims to increase production of its Zohr natural gas offshore Mediterranean field to 700 million standard cubic feet per day (mscf/d) in May 2018.

Enppi Signed Contracts for 12 Projects in 2017

Engineering for the Petroleum & Process Industries (Enppi) signed contracts for implementing 12 national and international projects over the course of 2017, said Mohamed Hathout, head of Enppi. The company also signed 33 assignment orders in the oil sector during the 12 month period. Of all the projects undertaken by the company, 59%

were local and 41% were international. The news came during the general assembly chaired by Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, to review the company's result in 2017. The value of Enppi's national and international contracts reached EGP 21.5 billion in 2017.

ASORC, NBE Reach Agreement over \$10M China Loan

The Assiut Oil Refining Company (ASORC) signed an agreement with the National Bank of Egypt (NBE) on April 4th regarding a \$100 million loan from the China Development Bank. The original loan was taken out by the ASORC to finance upgrades to its refinery, including the installation of a Continuous Catalytic Reforming (CCR) unit which

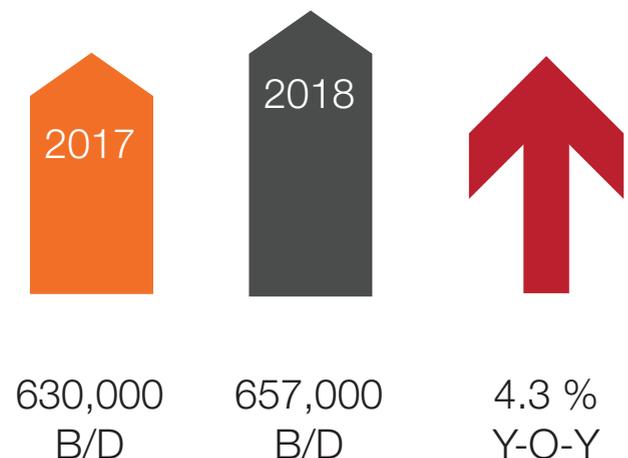
will produce high-grade octane. The ASORC-NBE agreement was signed by ASORC Head, Nagy Kassab, and NBE's Vice Chairman, Yehia Abu Elfotouh in the attendance of Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla. Kassab stated that ASORC will also provide a \$64 million contribution towards the project.

Egypt Completes 24 Hydrocarbon Projects Since 2014

The Egyptian oil and gas sector completed 24 projects over the past four years, investing \$16.2 billion in the process, Egyptian Minister of Petroleum and Mineral Resources Tarek El Molla has stated. The developments enabled the production of around 4.1 billion cubic feet per day (bcf/d) of natural gas and around 36,000 barrels of condensates. The

minister predicted that natural gas output will continue to experience growth over the short and medium term, especially in light of the Eastern Mediterranean gas fields still under development. A total of 16 projects will be completed during the current development phase.

DAILY CRUDE PRODUCTION



Egypt Crude Production Reaches 660,000 b/d

Egypt is currently producing around 660,000 barrels per day (b/d) of crude oil, head of the Egyptian General Petroleum Corporation Abed Ezz El Regal said. The rate of production is expected to increase by the end of the 2017/18 fiscal year in June. The optimistic predictions come following recent oil discoveries in

addition to increasing investments made by international oil companies in the Gulf of Suez and the Nile Delta, as well as the concession areas of foreign investors, stated Ezz El Regal. The capacity of Egyptian refineries has reached 38 million tons, Ezz El Regal pointed out.

Egypt Plans Energy Subsidies Reduction

The Egyptian government plans to reduce subsidies of petroleum products by 26% and electricity subsidies by 47% in the annual budget for the 2018/19 fiscal year (FY). The government aims to cut its expenditure on subsidies by more than quarter, reducing the budget from EGP 120.926 billion to EGP 89.075 billion.

Electricity subsidies will total just EGP 16 billion in FY 2018/19, down from EGP 30 billion in the current financial year. The government submitted the 2018/19 draft budget to the House of Representatives in March 2018 to be approved before the end of June.

Egypt, Cyprus to Sign Gas Pipeline Agreement

Egypt and Cyprus will soon sign an agreement to establish an undersea natural gas pipeline between Cyprus's exclusive economic zone to an Egyptian liquefied natural gas plant, said Cypriot Foreign Minister Nicos Christodoulides. This comes as the Cypriot minister met with Egyptian Minister of Foreign Affairs Sameh Shoukry in Egypt on April 10th to discuss bilateral relations.

"We believe that there is a bright future for the cooperation between Cyprus and Egypt in the field of hydrocarbons as our cooperation is based on solid foundations," Christodoulides said. During the meeting Shoukry noted that Egypt is looking forward to the visit of Cypriot President Nicos Anastasiades to 'Roots Revival Week' event, which will be held in Alexandria and Sharm El-Sheikh.

UAE's ADIA to Invest \$2B in Egypt

The Abu Dhabi Investment Authority (ADIA) plans to invest \$2 billion in Egypt's oil, infrastructure and electricity sectors during the second half of 2018, head of the Arab Union for Direct Investment (AUDI), Mohamed Sameh, stated. The recent meetings of the AUDI in Dubai and Jordan revealed a strong interest

from Gulf investors to work in Egypt, said Sameh. He forecast that Gulf investment will double in the coming period as Egyptian companies are offered on the stock market. The UAE government, banks and individual investors are particularly interested in investing more capital into the Egyptian markets.

Cabinet Approves Offshore Propylene Platform

The Egyptian cabinet approved establishing an offshore floating platform at Gameel area, West Port Said, to receive propane gas and liquefied propylene. The cabinet further granted the Egyptian Propylene and Polypropylene Company the right to manage, operate and maintain the platform for 15 years. The decisions were taken during the 116th meeting

chaired by Prime Minister Sherif Ismail on April 11th. 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 international companies.

Egypt Fuel Prices Could See 45% Increase

Egyptian fuel prices could increase by up to 45% during Q1 2018/19, according to a report published by Beltone. The financial company predicted that the upcoming cuts to fuel subsidies could see the price of fuel rise by between 35% and 45% during the first three months of the next financial year. Beltone's report showed that the price increases

could raise the country's inflation rate by between 3% and 5%. The government is planning to reduce subsidies from EGP 120.9 billion to EGP 89 billion in the 2018/19 fiscal year. Draft budget plans would see subsidies of petroleum products cut by 26% while electricity subsidies would be reduced by 47%.

Egypt, Saudi Arabia Sign Petroleum MoU

The Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, has signed a memorandum of understanding (MoU) with Saudi Minister of Energy, Industry and Mineral Resources, Khaled al Falih, allowing the sharing and exchange of information on the petroleum and mining fields between the two countries. The discussion took place on the sidelines of the 16th International

Energy Forum Ministerial Meeting, held in India on April 10-12. The MoU will enhance the cooperation between Egyptian and Saudi petrochemical companies and facilitate the exchange of experiences. El Molla and his Saudi counterpart agreed to arrange visits between Egyptian oil companies and Saudi companies operating in the fields of petroleum and mining.

Egyptian Fuel Exports Fall 0.2% Y.o.Y

The value of Egyptian fuel exports fell 0.2% year-on-year (Y.o.Y) to January 2018. Statistics published by the Central Agency for Public Mobilization and Statistics (CAPMAS) reveal that Egypt exported \$330.554 million of oil in the month of January 2018, compared to \$331.227 in January 2017. Meanwhile, the

value of Egypt's crude exports dropped 18.66% Y.o.Y, reaching \$156.421 million in January 2018, from \$192.248 million in the same month of the preceding year. Exports of petroleum products increased by 175% Y.o.Y recording \$33.193 million in January 2018, compared to \$12.074 million in January 2017.

Egypt Allocates EGP 3.5B for Connecting Households to Gas Grid

The Egyptian Ministry of Petroleum and Mineral Resources has allocated EGP 3.5 billion in the 2018/19 budget to increasing the number of households connected to the natural gas grid. The ministry of petroleum aims to connect 1.35 million households across Egypt to the natural gas grid during 2018, in a bid to reduce the national rate of butane

consumption. The ministry expects that butane consumption will decrease by 2% each year to reach 3.9 million tons in the 2019/20 financial year, down from 4.12 million tons in 2017/18. Egypt's production of butane is expected to increase by 0.52 million tons to reach 2.6 million tons by 2019/20.

IGU Reviews Egypt's Gas Industry

Egyptian Minister of Petroleum Tarek El Molla met with President of the International Gas Union (IGU) David Carroll to discuss the development of the Egyptian natural gas industry. El Molla reviewed measures taken in response to global changes in the oil and gas markets. These included developing the terms of the agreements and paying

arrears to international oil companies (IOCs), increasing coordination with IOCs operating in Egypt, and developing a strategy to increase exploration and production activities. The minister also reviewed the economic reform program and the steps taken by Egypt to become a regional gas trading hub.

Egypt's Daily Crude Oil Production Increases by 4.3%

Egypt's daily crude oil production has increased by 4.3% so far in 2018, compared to 2017, head of the Egyptian General Petroleum Corporation (EGPC) Abed Ezz El Regal has said. Egypt is currently producing 657,000 barrel per day (b/d) compared to 630,000 b/d during 2017. Ezz El Regal revealed the

figures on the sidelines of the first day of the annual Mediterranean Offshore Conference and Exhibition (MOC 2018). Figures published by the Central Agency for Public Mobilization and Statistics (CAPMAS) show that the country's output of crude oil, condensates and butane increased by 0.79% in January 2018.

Egypt Signs Two Agreements with Halliburton

The Egyptian Ministry of Petroleum and Mineral Resources has signed two agreements with Halliburton on the sidelines of the Mediterranean Offshore Conference and Exhibition 2018 (MOC 2018). The deals were inked by the Ministry of Petroleum's First Undersecretary for Agreements and Discoveries Ashraf Farag and Halliburton's Egypt and Libya area manager, Osama Abdel Halim. The

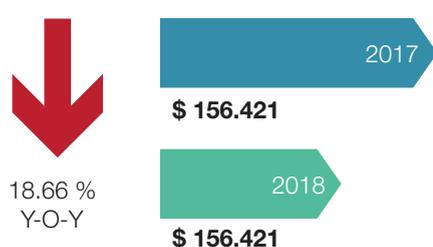
agreement took place on April 17th during the first day of MOC 2018 in Alexandria, an annual conference organized by the Ministry of Petroleum to discuss issues related to eastern Mediterranean oil and gas. The two agreements aim to complete the Egyptian electronic gate for marketing oil and gas exploration and production concession areas.

Egypt, Toyota Sign New Drilling Rig Agreement

The Egyptian Natural Gas Holding Company (EGAS), Ganoub El Wadi Petroleum Holding Company (Ganope) and Toyota have signed a \$600 million agreement to purchase an offshore drilling rig capable of operating in deep water. The deal was signed between EGAS head Osama El Bakly, head of Ganope Mohamed El Sheimy and the

general manager of oil & gas of Toyota Tsusho at the Mediterranean Offshore Conference and Exhibition (MOC 2018). The agreement stipulates that the project will be implemented in three stages starting with the preliminary study stage followed by the project development stage.

CRUDE OIL EXPORTS



Gastec Owns 52% Market Share in Vehicles' Natural Gas Sales

The Egyptian International Gas Technology (Gastec) owns 52% of the market share of the total natural gas sales for cars. The number of cars capable of running on natural gas has increased significantly over the past period, with around 4314 cars being converted to do so in 2017, Gastec head Abdel Fattah Farahat stated. The company has successfully

converted around 110,000 cars since their operations began, Farahat said. He further explained that the sales of natural gas for cars reached 191.6 million cubic meters in 2017. Farahat pointed out the importance of converting vehicles to natural gas, which will decrease benzene imports and be cheaper for citizens.

ADES Borrows \$450 M to Finance Acquisitions

ADES International Holding Company will borrow a syndicated loan worth \$450 million over five years in order to finance acquisitions following the company's 2017 initial public offering (IPO). The European Bank for Reconstruction and Development (EBRD) announced

the provision of \$125 million debt fund as part of the \$450-million-facility in order to enable ADES to expand its onshore and offshore drilling fleet in Egypt, the Middle East and North Africa. ADES will receive the money in three tranches, with borrowing costs fixed at 5% over the LIBOR rate.

SDX Starts Initial Drilling at South Disouq

SDX Energy Corporation started the initial drilling operations its Ibn Yunus-1X exploration well located at South Disouq field. The company plans to follow the Ibn Yunus-1X, the first of four planned new wells at South Disouq, with an exploratory well and two appraisal wells. The Ibn Yunus-1X

well is predicted to be completely drilled within 30 days. "I am very excited to be back drilling in the South Disouq concession. The success of the SD-1X well proved the existence of source rock in this area which was our biggest uncertainty pre-drill," said Paul Welch, SDX chief executive.

Eni to Drill 3 Wells at Zohr

Eni plans to drill three additional wells as part of the first phase of development at Zohr natural gas field, an official at the Egyptian Natural Gas Holding Company (EGAS) stated. The decision means that a total of nine wells will be drilled during the first stage. The extra wells come as part of a

plan to increase gas production rates to over 700 million standard cubic feet per day (mscf/d) by May 2018 and 1.8 billion cubic feet per day (bcf/d) by the end of 2018. The mechanical and electrical installation works for Zohr field's first and second phases will soon be completed.

Edison to Sell E&P Division

Italy's Edison Company plans to sell its \$2-3 billion exploration and production (E&P) division to focus on its retail operations, four oil and gas sources said. The move will see the company, which is 99.48% owned by French utility firm EDF, leave the fossil fuel industry. The company's Egyptian assets, which include Egypt's Abu Qir concession as well as over 250 million barrels of oil equivalent

(mboe) in reserves, are seen among the most attractive parts of Edison's portfolio. Edison holds a 100% operated participating interest in the Abu Qir concession in the Nile Delta offshore. It also has a 20% participating interest in the Rosetta offshore production license.

SDX Makes New Egyptian Gas Discovery

SDX Energy Incorporation has announced natural gas findings at its Ibn Yunus-1X exploration well at South Disouq in Egypt. SDX drilled the 9068 ft Ibn Yunus-1X well and encountered net conventional natural gas pay of 100.8 feet in the Abu Madi horizon. The horizon had 28.5% average porosity in the pay section. The Ibn Yunus-1X well came

in with a reservoir section exceeding pre-drill quality and thickness expectations. The Ibn Yunus-1X well is expected to be connected to existing infrastructure located next to SD-1X, the company's original discovery in the basin. The SD-1X well is expected to start production in the second half of 2018.

TransGlobe Produces 11,776 b/d of Oil in Egypt

TransGlobe Energy Corporation has announced that it produced 11,776 barrel per day (b/d) of oil from its Egyptian fields during Q1 2018. The company completed drilling the K-46 development in the Asl B area in March 2018. The Asl B formation is currently producing around 45 b/d

and has an estimated net oil pay of 15 feet. TransGlobe is also drilling the K-45 development well, the second of its type at the South K-field. The K-45 is targeted at the main Asl A sand, located in the South K field's crestal position.

Edison to Drill First Exploratory Well in North Thekah in 2019

Edison plans to drill its first exploratory well in the eastern Mediterranean North Thekah offshore concession in 2019. The company is further developing its 40-producing Abu Qir field, said Nicola Monti, executive vice president of Edison's exploration and production (E&P) division. Moreover, Royal Dutch Shell's executive vice president, Sami

Iskander, announced during a press conference that the company will continue deep-water oil and natural gas E&P off Egypt's Mediterranean coast. Shell saw its Egyptian investments increase dramatically in 2016 after its acquisition of British Gas, transforming it into one of the largest oil and gas producers in Egypt.

BP to Boost WND Production to 1.3bcf/d of Natural Gas

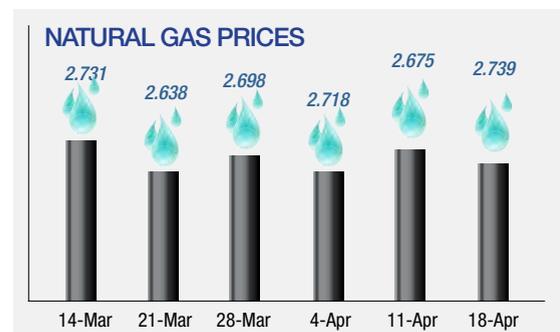
BP plans to boost natural production of West Nile Delta (WND) project to reach 1.3 billion cubic feet per day (bcf/d), President of BP Egypt Karim Alaa has said. Alaa's comments came during the first day of the annual Mediterranean Offshore Conference and Exhibition (MOC 2018), which began in Alexandria on

April 17th. According to BP's energy forecast, global energy demand will increase by one-third by 2040 due to the rapid growth of developing economies. There will therefore be a substantial rise in the demand for natural gas, the world's second largest source of energy, over the coming two decades.

Schlumberger Invests \$60M in Egypt Center of Efficiency

Schlumberger invested around \$60 million in the construction of the Egypt Center of Efficiency which provides competitive services and enables the exchange of information for the Egyptian oil and gas industry, said Hussein Fouad El Ghazzawy, Schlumberger's vice president and managing director, Egypt and east Mediterranean region. This comes

as El Ghazzawy presented the company's vision for the country's ambitions to become an oil and gas regional trading hub, during the second day of the Mediterranean Offshore Conference and Exhibition (MOC 2018) on April 18th, in the session entitled "Egypt as a Regional Energy Hub".





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SAUDI ARABIA

Saudi Aramco awarded Jacobs Engineering Group an engineering and project management contract for the Zuluf offshore field in the Arabian Gulf. Under the contract, Jacobs will oversee a new gas, oil separation plant (GOSP), gas compression facilities, and a new water injection plant and pipelines. Work on the Zuluf Field development program began in January 2018, and the facilities will produce 600,000 barrels per day (b/d) of heavy crude oil.

Aramco signed eight deals worth \$10 billion with French companies during Crown Prince Mohammed bin Salman's visit to France. The company's CEO, Amin

Nasser, stated on April 9th that the oil giant will finalise the accords on April 10 in an official signing ceremony during a Saudi-France economic forum. Aramco and Total plan to sign an agreement to expand their joint refinery in Saudi Arabia. Neither Total or Aramco gave any further details about the deal.

Saudi Aramco signed preliminary cooperation agreements worth \$10 billion with several leading oil services companies during Crown Prince Mohammed bin Salman's visit to the US on March 27. Nearly half of the agreements are for the procurement of upstream oil equipment and services,

signed with Schlumberger, Baker Hughes, Halliburton, and Weatherford. No further details of the agreements were given.

Riyadh and Moscow are considering extending Russia's current short-term alliance with OPEC to curb oil production that began in January 2017 after a crash in crude prices. "We are working to shift from a year-to-year agreement to a 10-to-20-year agreement," Bin Salman stated added that the allies didn't agree to the details of the agreement.

UAE



ADNOC awarded two major contracts worth more than \$3.5 billion to Korean Samsung Engineering through ADNOC Refining, a wholly-owned ADNOC subsidiary. The first contract is an Engineering, Procurement, and Construction (EPC) contract worth \$3.1 billion for a crude oil processing flexibility project, while the second contract authorises a \$473

million project to recover power and water at the ADNOC-owned Ruwais oil refinery.

Sitting on a significant oil and gas reserves within its diverse petroleum geology, **UAE's Ras Al-Khaimah (RAK) launched its first petroleum-licensing round on April 2 for exploration and development contracts in**

seven areas. The blocks have access to existing petroleum infrastructure including pipelines, and oil and gas-processing facilities. Bids are expected to be received in November 2018, before a new exploration and production sharing agreement is awarded.

LIBYA



Libya lost over \$145 million since the closure of its El-Feel oilfield in the Murzuq on February 23, the state-owned National Oil Corporation (NOC) stated on March 26. El-Feel oil field produces more than 70,000 b/d. It has been closed since February 24, after members of the Fezzan unit of the Petroleum

Facilities Guard (PFG) threatened workers, entered the administrative offices at the field, and fired weapons in the air, NOC said.

Libya oil output dropped by 80,000 b/d after an explosion on the Al-Zidah - Es Sider pipeline. According to the Libyan National

Oil Company, the cause of the explosion is unknown, but local sources attribute it to a "terrorist group". The repairs took over a week to complete, causing estimated losses of more than \$10 million.

BAHRAIN



On April 4, Bahrain announced the discovery of a new oilfield with an estimated production capacity of 200,000 b/d, swamping the Bahrain Field, which produces roughly 45,000 b/d. Halliburton has

been contracted to appraise how much of the reserves in the Khaleej Al-Bahrain basin are recoverable. However, the crude may prove costly to extract; it is in a tight reservoir and will be technically challenging and high cost

to develop. Former Saudi Aramco Executive Vice President, Sadad Al-Husseini, estimates that a new well in the field will cost "no less than \$20 million."

OMAN



Petroleum Development Oman (PDO) agreed contracts worth more than \$800 million with five local companies: Abraj Energy Services, MB Petroleum Services, Cactus

Premier Drilling Services, BaOmar Oil Field Services, and Mideast Integrated Drilling & Well Services Company (Midwesco). The contracts constitute 10-year deals in which

the firms will provide work-over services at PDO wells, including modification, repair and maintenance, suspension and abandonment.

IRAQ



The Iraqi Ministry of Oil has invited investors to submit proposals for the construction of an oil refinery in Anbar province. The deadline for proposals is June 14th and will be constructed on a Build-Own-Operate or a Build-Own-Transfer basis. "The country is looking to increase its refined output to 1.5 mb/d by 2021, 500,000 b/d of which would be exported," the Ministry of Oil recently stated.

Iraqi Basra Light crude imports to the Louisiana Offshore Oil Port (LOOP) rose by more than 4.4 million barrels in the first

half of April. A total of 4.937 million barrels of crude were imported into Morgan City, Louisiana, more than double the total Basra Light imported into LOOP for all of March (2.027 million barrels), and a 840% increase from the imports in the first half of March (525,000 barrels).

Iraq may double the current estimated amount of oil reserves, according to the country's oil minister Jabar Al-Luaibi. If estimates prove to be true, OPEC's second largest producer

would overtake Saudi Arabia as having the highest proven reserves in the Middle East, and contend with Venezuela for the largest worldwide reserves.

Iraq exported 3.453 mb/d of crude oil from its southern ports in March, a slight increase from the numbers for February, which marked the third month in a downward trend.

KUWAIT



Kuwait Petroleum Corp (KPC) signed an agreement with an international firm securing the long-term supply of Liquefied Natural Gas (LNG) to keep up with rising demand for power generation in the country, said Oil Minister Bakheet Al-Rashidi. The Minister did not confirm the identity of the company but described it as

a leading player in the LNG sector.

Kuwait Petroleum Corporation (KPC) plans to invest \$113 billion over the next five years with the aim of boosting oil exploration and production both inside and outside the country. The investments

are part of KPC's 2040 roadmap for the country's oil sector, the objective of which is to maximize revenue generation for Kuwait's economy and **raise production of non-associated gas to nearly 500 million standard cubic feet per day (scf/d) by the end of 2018.**

IRAN



Iran plans to halve gasoline imports starting in late June from 9 million liters per day to 4.5 million liters per day. The Persian Gulf Star Refinery is decreasing the country's reliance on processed fuel imports and will have a production capacity of 360,000 b/d of condensate once fully operational.

NIOC will cut South Pars condensate production in Q2 2018 by 25%, producing 350,000 b/d between April and June 2018.

Believing that energy is the most promising sphere for cooperation with Iran, **Russia announced plans to invest more than \$50**

billion in Iranian oil and gas fields. Russian gas companies are systematically working on development of fields in Iran. The expected amount of investments is over \$50 billion.

ALGERIA



Algeria plans to pass a new energy law that offers tax incentives to attract investment and is in discussion with foreign firms such as BP and Anadarko regarding its shale gas reserves. "Evaluation studies on shale gas potential are going on. This will take five to 10 years," Energy Minister, Mustapha Guitouni, stated. Sonatrach is trying to expand operations abroad as the country looks to

attract foreign investors. "Egypt is interested in working with us," Guitouni said.

Total, Sonatrach, and Cespa have started production from the Timimoun natural gas project in Wilaya de Adrar in southwestern Algeria. The project has a maximum capacity of nearly 5 mcm/d. French energy major Total has a 37.75% stake, while Sonatrach

owns 51% of the field, and Spanish oil and gas firm Cespa has a 11.25% stake. Cespa is responsible for marketing all of the gas produced at the Timimoun field.

Anadarko, Total, Eni, and Statoil are interested in joining the Sonatrach to develop offshore drilling in the North African country.

THE ART OF REVIVING MATURE FIELDS

AN INTERVIEW WITH

DAVE THOMAS

CHEIRON'S CEO

By Mariana Somensi



Cheiron is a rapidly growing independent E&P company, which has a portfolio of oil and gas assets held in Egypt, Mexico and Romania producing around 50,000 barrels of oil equivalent per day.

The Company operates all its fields and concessions and works in a range of different offshore and onshore operating environments. In Egypt, the assets are mainly located in shallow water in the Gulf of Suez, with some fields in the Mediterranean Sea and onshore in the Western Desert. The international fields are all to be found onshore in a variety of terrains.

Could you comment on the current operations and future plans at Cheiron's most recent acquisitions in the North Bahariya and West El Burullus concessions?

The company completed the acquisition of a 50% interest in the North Bahariya oil concession in the Western Desert in spring last year and, along with its partners, has been pursuing an active drilling and workover program on the fields.

In parallel with the field activity, we have been generating full field water flood plans for the two main fields (Abrar and Ganna) using advanced seismic analysis techniques to improve reservoir mapping

and applying new technologies such as drilling with casing. The current production rate is running at a little under 9,000 bop/d and we believe we can increase this to around 18,000 bop/d by drilling 50 to 60 low-cost wells and installing new production and water injection facilities. Ultimately, we plan to produce at least 50 million barrels of gross oil reserves from the area, which will bring the recovery factor more in line with other fields in the region. We are just starting to discuss the development plans with the government and our partners before moving into the implementation phase.

The West El Burullus (WEB) gas field development in the shallow water Mediterranean is a different type

Cheiron has a particular focus on maximizing reserves recovery from mature fields through the optimization of development plans (wells and facilities) and near-field exploration and appraisal drilling. As part of the optimization process, it seeks to apply the best available technology on all its assets and has a strong cost management ethos.

Egypt Oil & Gas had the opportunity to talk with Dave Thomas, Cheiron's CEO, and discuss the company's activities and future plans in Egypt. Dave took over as Cheiron CEO in April 2017 after a long career in the oil and gas industry with companies including Conoco, Eni and Melrose Resources.

of project. This will involve the installation of two minimum facilities platforms tied back with a 35 km pipeline to the existing onshore West Delta Deep Marine (WDDM) processing plant. The development includes two separate fields (WEB and Papyrus) which will need a total of seven wells to access reserves of around 250 billion cubic feet (bcf).

The development is being executed by our Amapetco joint venture company and we expect the tenders for the main project works to be issued in May. The project is then expected to be sanctioned in the third quarter this year. First gas from the fields in due the first quarter of 2020, although if possible we will be seeking to accelerate this schedule.

Is the company facing any challenges at North Bahariya and West Burullus? If yes, how does Cheiron overcome them?

There are challenges associated with both developments, but nothing that I would characterize as being outside the normal issues that the industry has to manage to successfully execute these types of projects. These range from putting in place the processes to guarantee the highest levels of safety and environmental performance, to technical challenges relating to reservoir characterization and project management, all the way to raising financing.

To manage the process, we rely on the experience and professionalism of our Cheiron and joint venture company staff, the support of our external advisors and our lenders.

We also have implemented a formal Project Management System, which provides assurance that at each major decision point along the project schedule all relevant factors (health and safety, technical, operational, commercial and financial) and risks are fully taken into consideration.

You mentioned health, safety and environmental standards (HSES) performance as a key element for your project planning. Could you expand on this?

Cheiron adheres to the highest international operating standards (with relevant ISO accreditation) and has HSES in line with the World Bank Equator Principles. As such, HSES planning forms an integral part of our business and project management processes.

We are also always looking to improve and over the past two years have made a step change in our environmental performance with the support of the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD). A large number of projects have been completed across our various joint venture companies, including initiatives to improve discharge water quality, secondary containment, energy efficiency, waste management and personnel welfare, amongst others.

We also continually review our safety management systems and introduce enhancements as and when appropriate. This year we are launching a program designed to further strengthen the safety culture across the company.



The redevelopment of Zaafarana will allow the facilities capacity to be increased and new infill development wells to be drilled.



We understand that Cheiron also has plans to redevelop the Zaafarana oil field in the Gulf of Suez. Could you provide us with an update on the status of this project?

This represents the third significant development project which Cheiron plans to execute in Egypt and will involve the replacement of the Floating Production Storage and Offtake (FPSO) vessel, which is currently deployed on the field. This will allow the facilities capacity to be increased and new infill development wells to be drilled. There is also the potential for an appraisal drilling program, which could lead to further development activity in new reservoir horizons. A steering group has

been established with government and company representation to help coordinate the project planning while necessary regulatory approvals are put in place.

What are your plans for your international assets in Romania and Mexico?

We have recently extended our concessions in Romania to provide additional time for the Company to optimize the future appraisal and development work program on the main concessions such as Silistea and Oporelu. To help support this activity, we are performing a number of integrated technical studies to incorporate new seismic and well data into the reservoir models and update our assessment of the field potential.

In Mexico, after the recent Cardenas Mora acquisition, we are now looking to consolidate our operating position around the main fields, adding value through drilling and completions, surface infrastructure and commercial optimization.

As the Company continues to build its business in Egypt, does Cheiron have plans to acquire new interests in different areas? Which areas you would focus on?

Given the number of high quality new projects we have in the portfolio, Cheiron is in the fortunate position of not needing to acquire new assets to grow. In fact, we expect to be able to increase our production levels to over 60,000 boepd from the fields which we already have in the portfolio.

Like any ambitious company, however, we are always on the lookout for new opportunities and generally focus in our current areas of operation, where we can add value by identify synergies and/or using specific technical and operational expertise. That means we tend to gravitate towards opportunities on the southern Gulf of Suez, shallow water Mediterranean and Western Desert. We would not, though, rule out considering any farm-in or asset acquisition that has the potential to add material value to the Company.

Being able to make a profit from mature fields is a key factor of Cheiron's success. What strategies and expertise does Cheiron implement in order to maximize the value and hydrocarbon recoveries from its mature fields?

Successful mature field development tends to involve focusing efforts on three main areas, including short-term production delivery, long-term reserves upgrades, and strict capital and operating cost control.

For production, the company places great importance on maintaining high well and facilities uptimes, which means having a deep expertise in certain specific areas, well-managed preventative maintenance programs, and, perhaps most importantly, simple design philosophies. We also have a strong subsurface and production technology team, which continually looks for workover and recompletion opportunities.

For reserves upgrades, we place a strong emphasis on integrating geoscience input with reservoir performance monitoring to identify drilling opportunities (both infill and appraisal well locations). We also continually try to improve our understanding of the reservoirs. For example, at the moment, we are reprocessing old 3D seismic data on our main Gulf of Suez field, Amal, in an attempt to use new algorithms to improve the reservoir imaging and identify near-field appraisal well locations.

For cost management, we invite and expect challenge throughout the organization, both within the Cheiron team and our joint venture companies. This challenge starts at the beginning of a project or budget cycle, and continues until it is translated into cooperative action with our contractors and suppliers to find fit for purpose and minimum cost solutions.

With the ongoing modernization of the petroleum sector, as well as the national economic reform, how does Egypt compare to the other countries in Cheiron's portfolio in terms of market environment?

In the broadest terms, the industry environment here compares favorably with many other countries worldwide. It is a mature operating environment, but it still presents a wide range of investment opportunities, from high impact exploration in relatively new basins to mature onshore and offshore field development optimization projects. There is also a very well established industry support base in the country and a depth of professional talent to draw on, both in the public and private sectors, to help deliver the key projects.

With respect to the modernization program, we believe the direction of travel has been well set, particularly with respect to the division of regulatory and partner responsibilities, deregulation in the gas markets and the very important strategic regional energy hub initiatives. We are also obviously very supportive of the government's plans to address the longstanding issue of the IOC arrears. This still has the potential to distract the industry from fully focusing on the core business of finding and producing more oil and gas for the country.



At the moment, we are reprocessing old 3D seismic data on our main Gulf of Suez field, Amal, in an attempt to use new algorithms to improve the reservoir imaging and identify near-field appraisal well locations.



Enhancing young professionals' skills is a pillar of the Ministry of Petroleum's modernization program. How does Cheiron optimize the skills and performance of its young professionals?

Cheiron places great importance on developing our young talent and, similar to most of our peers, seeks to address this in a number of different ways.

We have a fairly conventional appraisal and career development process, which helps to set performance standards and identify training and development needs. We also use mentoring relationships (where we have the organizational capacity) and place a strong emphasis on multidisciplinary teamwork which helps to broaden out an individual's understanding of the wider business environment.

Like most small or mid-sized companies, however, what Cheiron can really offer a young professional is an exposure to a wide range of responsibilities and experiences very early in their career. I don't believe there is any substitute for learning on the job, providing there is the appropriate level of support and encouragement provided by peers, mentors and management.



TRACKING THE GENDER GAP IN EGYPT'S PETROLEUM SECTOR: FROM ACADEMIA TO FIELD

By Mahinaz El Baz

Representing less than 10% of the employees in Egypt's oil and gas sector, women account for a significantly smaller share of the industry's workforce than they do in almost all other industries, according to the Central Agency for Public Mobilization and Statistics (CAPMAS)'s workforce report 2016.

This relatively small percentage includes women who work in business, administrative, financial, legal, and commercial roles. They have a very limited presence in technical posts, which are often considered prerequisites for career advancement, as well as upper management roles.

The gender gap in the oil and gas industry is a direct result of the gap between male and female

students at faculties of petroleum engineering, in addition to geology and chemistry departments at faculties of science all over Egypt. Consequently, the economic loss to the industry is threefold.

First, both international oil companies (IOCs) and national oil companies (NOCs) have a smaller number of highly-qualified female candidates to choose from when filling positions. This is



The Egyptian Academia: Where the Gap Starts

In most of the academic fields of study in today's Egypt, women and men are equally represented in college education. Yet, there is still an obvious gap in specific fields of study, such as chemical and petroleum engineering, geology, and geophysics. Geology and petroleum engineering are both typically male-dominated fields of study with comparatively smaller rate of women than other scientific fields.

CAPMAS's official statistics show that the lowest percentage of female petroleum engineering graduates during the past five academic years was in 2015, when only six out of 232 graduates were females, representing around 2.58% of the total number of petroleum engineering graduates in this year. The highest percentage of female petroleum engineering graduates was in 2014, when 12.56% of the graduates were females.

The statistics for Egyptian geology graduates show a smaller gender gap than petroleum engineering. The average percentage of female graduates from geology departments all over Egypt from (2013-2016) is 26.8%. This percentage is four times higher than the average percentage in petroleum engineering in the same period of time, which is 6.1%. The highest percentage of geology female graduates during the past five academic years was in 2016, when around 32% of the graduates were females. On the contrary, the lowest percentage was in 2014 when 44 out of 218 graduates were females, representing 20.18% of the total number of graduates this year, according to CAPMAS.

Basma El Zafrany, a geophysics graduate, believes that the petroleum industry has lately become a more closed industry than before due to the multiple restrictions on hiring female fresh graduates. This is negatively affecting the percentage of women in the industry and accordingly increasing the gender gap.

Menna Lotfy, a student at the Faculty of Petroleum and Mining Engineering at Suez University, told Egypt Oil & Gas that she believes the gap exists "because it is not usual for us in Egypt to see females in the petroleum fields... the environment and the culture make it unavailable and, unfortunately, we have to face this problem after the graduation". For her, one of the main challenges of entering the industry are restrictions on training. "The field is banned for us," she says, "...the only available option is the office".

As for life after graduation, El Zafrany explained that the main challenge facing her as a fresh graduate aside being female, is the high hiring standards in the industry. Fresh graduates are required to have a strong technical knowledge and developed personal skills, such as communication, presentation, and team work skills. Most of these skills are not taught in the academic life.

She further highlighted that another challenge facing women in the industry is being restricted from working in both onshore and offshore fields. "Multinational companies allow that. [Yet,] it's harder in national oil companies. [IOCs] like Schlumberger and Halliburton hire females as much as they can with fair interviews, while national companies have restrictions and some favoritism," she added.

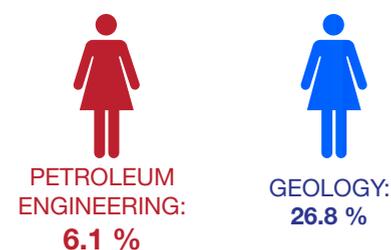
especially true among the industry's middle and higher-ranking positions, as many talented women either never join the industry after graduation or drop out prematurely.

Second, the industry misses out on the greater quality of teamwork, has a lower diversity of perspectives, and does not reach a level of creativity in solving technical and business problems that characterize more gender-diverse sectors.

Third, the industry's relative lack of gender diversity, particularly in the senior and upper managerial levels, negatively affects its reputation among women as a career destination. This could create a vicious circle, one in which the industry finds it progressively harder to recruit women across the board, Katharina Rick et al. noted in their paper entitled "Gender balance in oil and gas: An important and attainable goal".

When asked about how she would resolve the problems facing female petroleum engineers, Lotfy argues that it is simply a case of recognition: "I think the main problem is the preparation of the petroleum industry for us. For example, we do not find fields in Egypt cover our simple needs,

FEMALE GRADUATES IN EGYPT



such as the accommodation, so I think if the companies start to believe in us and know that it is our work, the problem will be solved and the gap will be eliminated," she says.

Female Undergraduate Success Story

Nayéra Tawfik, offshore and coastal systems engineering student at Faculty of Engineering at Alexandria University, told Egypt Oil & Gas her success story about getting the opportunity of going to an offshore field during the summer training. "Last summer, I had the opportunity of going to an offshore field in Ras Gharib for a week, during my 3 month training with Advanced Energy Systems (ADES). It was such a great experience, especially that ADES is a NOC. It is harder for NOC female trainees and employees to work in the field, due to the Egyptian culture. However, I believe that open-minded and encouraging male leaders in these companies will lead the change and allow women to find their way in this promising field."

Referring to the gender gap in the industry, Tawfik said that "the main reasons are the Egyptian culture barriers. Egyptians do not accept the idea of allowing women to work in the oil and gas industry, especially upstream activities. Even if girls are willing to join the industry, they usually do not find any support from their parents and family, due to the reputation of the petroleum as a male-dominated industry."

“There are certain departments in the faculty of petroleum engineering where females were not granted admission, it was only exclusive for male students.”

DR. REHAB MOTASIEH EL-MAGHRABY,
Assistant Professor of Chemical and Petroleum Engineering at Suez University

In addition, Tawfik mentioned that she is the only female student out of 21 students in her department. "In general, we have less opportunities in Alexandria compared with Cairo and Suez, as most of the IOCs specialized in upstream activities do not have branches in Alexandria, thus they do not offer training for undergraduate students in the governorate. In Alexandria, we have a gender gap and a training gap as well."

When asked about the challenges facing her at college, Tawfik stated: "Personally, I learnt how to manage my student life as the only female in my department. I had to work hard to be able to cope with such a challenging environment. Yet, my efforts were fruitful. I have to admit that my mother's support is one of the main reasons of being able to overcome many challenges."

"Women need a seat at the table, they need an invitation to be seated there, and in some cases where this is not available, well then you know what? They need to create their own table," she concluded.

Faculties' Staff Members Gender Gap

The gender gap between men and women in academia is not only among students. It clearly appears between faculty staff members. Women represented around 16.1% of petroleum engineering faculty staff members across Egypt in 2016, slightly decreasing from 16.8% in 2015. This was due to the increase in the number of male staff members from 94 to 99, while female members remained at 19, according to CAPMAS.

Dr. Rehab Motasiem El-Maghraby, assistant professor of chemical and petroleum engineering at Suez University, told Egypt Oil & Gas that "the limited participation of females in the field of oil/petroleum either as a faculty staff or job market employee is due to the nature of the work and the vision of the community to their participation. Even oil companies' preferences are directed towards male fresh graduates. There are certain departments in the faculty of petroleum engineering where females were not granted admission, it was only exclusive for male students."

Highlighting the barriers facing women in the petroleum industry, El-Maghraby said: "As a female, I have to think many times before taking

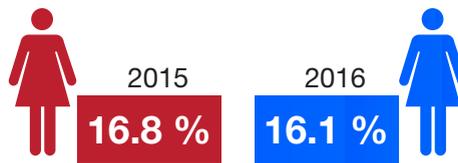
this step to enter the energy/oil field and accept its consequences. I have to be a fighter and a rock solid to survive in a male dominant community and a male preference job market, especially in the petroleum engineering sectors."

On the bright side, she explained that the "current generation of females is very ambitious... they are willing to make a difference and waiting for the chance to take part in developing their own country."

"In Egypt, current female students know exactly what they want, but the fact of being seen as a second option in the energy sector job market, with the priority of course given to the males in the field, is holding them back from achieving their dream," she added.

Commenting on the recently-launched campaigns to raise awareness among female students and fresh graduates regarding the importance of their participation in the petroleum sector, El-Maghraby said: "I do agree to some extent to this statement, but still more campaigns are needed. The involvement of oil/ petroleum companies in these campaigns is very limited and need to be enhanced. The power of youth in development

FEMALE STAFF IN PETROLEUM ENGINEERING FACULTIES

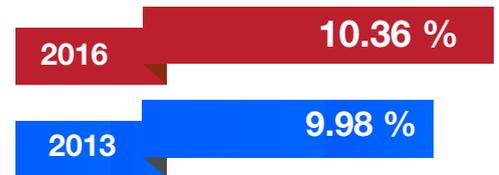


and their fresh minds is not fully utilized in the petroleum sectors. Also, the power of woman and her capability in the field is not fully outlined and appreciated by oil companies. All this needs more attention. Students in general and female in special do not fully see the importance of their contribution to the field."

Field Gender Gap

Due to the small percentage of female specialized graduates, attracting and retaining greater numbers of women in the Egyptian oil and

FEMALE EMPLOYEES IN THE PETROLEUM, MINERAL SECTOR



gas industry is challenging, especially within operational and field positions. Moreover, structural barriers within the industry make it difficult for women to advance and balance work and family commitments. "The industry can and must surmount these challenges and close the gender gap, however, if it hopes to position itself optimally for the future," Katharina Rick et al. noted.

The percentage of female employees in the Egyptian industry, petroleum and mineral resources sectors witnessed a slight increase from 9.98% in 2013 to 10.36% in 2016. However, this 0.38% increase represents one of the smallest percentages of female employees in Egypt's economic sectors, according to CAPMAS.

Egypt is currently working on narrowing the gender gap in the industry by empowering women and helping them achieve their own interests in all the petroleum sector's industries, the Egyptian Minister of Petroleum and Mineral Resources, Tarek El Molla, highlighted in his speech during the second edition of the Egypt Petroleum Show (EGYPS2018). El Molla also stated that women currently represent 30% of leading positions in the oil and gas sector.

Despite the continuous efforts of IOCs to recruit more women and make the workplace more hospitable for female employees, more efforts will be needed by both the government represented in NOCs and the Ministry of Higher Education before Egypt can witness a significant change in the number of women in the energy sector.



REPORT IN PRINT

The Economics of
Petroleum Transportation:

EGYPT'S PERFORMANCE IN 2016/2017

By Mahinaz El Baz

*T*ransportation services of petroleum products are a main pillar of the oil and gas industry all over the world. In hydrocarbon producing countries, they play a vital role linking upstream and downstream activities. In importing countries, they secure the linkage between importing locations and consumption points.

Egypt, as a heavy oil producing and exporting country, relies on a variety of tools and channels to transport the extracted oil from its onshore and offshore fields to both local and international consumers. It is worth noting that Egypt's petroleum industry has always been one of the core indicators of the health of the country's economic environment. Thus, petroleum and petroleum products transportation services support increasing the economic growth and help the country overcome the current economic hardships.

MAIN TRANSPORTATION CHANNELS IN EGYPT

There are four different petroleum products transportation channels in Egypt, which are railways, trucks, petroleum pipelines, and water transport units.

TRANSFERRED PRODUCTS BY DIFFERENT CHANNELS IN 2016/2017 THOUSAND METRIC TON

CHANNEL/PRODUCT	CRUDE OIL AND CONDENSATES	LPG	NAPHTHA	GASOLINE	KEROSENE	JET FUEL	DIESEL	MAZUT	TOTAL
RAILWAY TANKERS	-	-	-	26	-	94	287.3	7.0	414.3
TRUCKS	-	1920	-	4625	-	-	8745	2853	18143
PIPELINES	22249	3894	973	6003	67	609	14908	8185	56888
COASTAL TANKERS	5302	-	-	-	-	-	-	90	5392
SUMED PIPELINE	66294	-	-	-	-	-	-	-	66294
TOTAL	93845	5814	973	10654.0	67	703.0	23940.3	11135.0	147131.3

RAILWAYS

Egypt's railways are used for transporting four different petroleum products: gasoline, mazut, diesel, and jet fuel. The railway tankers had a total capacity of 54,859 tons of petroleum products in 2016/2017. Around 37.62% of these tankers are used for

transferring jet fuel, while only 7.75% are used for transferring gasoline. It is worth noting that seven railway tankers were scrapped during 2016/2017.

RAILWAY TANKERS' NUMBERS AND CAPACITIES IN 2016/2017

PETROLEUM PRODUCT	NUMBER	TOTAL CAPACITY TON	PERCENTAGE
JET FUEL	321	12038	21.94%
DIESEL	516	20640	37.62%
GASOLINE	125	4250	7.75%
MAZUT	417	17931	32.69%
TOTAL	1379	54859	100%

TRANSFERRED PRODUCTS BY RAILWAY TANKERS IN 2016/2017

PETROLEUM PRODUCT	QUANTITY METRIC TON	PERCENTAGE
JET FUEL	94191	22.7%
DIESEL	287312	69.4%
GASOLINE	25706	6.2%
MAZUT	7138	1.7%
TOTAL	414347	100%

PETROLEUM PIPELINES

Both pipelines and tankers are used in transporting crude oil, although petroleum pipelines are considered the best channel in some cases - pipelines are better from an economic perspective, if the distance between the wells and the port is long.

There are three types of petroleum pipelines in Egypt. The first type is the main pipelines, which are mainly long pipelines with large diameters. They are buried under the ground or under the sea. This type of pipelines are used to transfer oil or natural gas through high-pressure techniques. These transportation networks include several compressor stations in gas lines or pump stations for crude and multi product pipelines.

The second type is gathering pipelines. These are smaller interconnected pipelines forming complex networks with the purpose of bringing crude oil or natural gas from several nearby wells to a treatment plant or processing facility. In this group, pipelines are usually short - a couple of hundred meters - and with small diameters. In addition, subsea pipelines for collecting product from deep-water

production platforms are considered gathering systems.

The third type is distribution pipelines. They are composed of several interconnected pipelines with small diameters, used to take the products to the final consumer. Feeder lines to distribute gas to homes and businesses downstream, additionally pipelines at terminals for distributing products to tanks and storage facilities are included in this group.

The total number of both the main and internal oil pipelines of the Petroleum Pipelines Company (PPC) reached 58 lines with a total length of 5,590 kilometers (km) in 2016/2017. Sumed pipeline is considered the main pipeline, as it is an international crude oil marketing and storage hub. Sumed is a 320 km long. It consists of two parallel lines of 42 inches diameter. Its capacity is 117 million metric ton per year (mmt/y).

TOTAL TRANSPORTED QUANTITIES (MMT)



PETROLEUM PIPELINES COMPANY (PPC)'S PIPELINES NUMBERS, LENGTHS AND CAPACITIES IN 2016/2017

PIPELINE	NUMBER	LENGTH KM
MAIN PIPELINES		
A: CRUDE OIL	11	1236
B: CONDENSATES	6	501
C: LPG	10	1278
D: PRODUCTS	31	2426
INTERNAL PIPELINES	-	149
TOTAL	58	5590

TRANSFERRED PRODUCTS BY PPC'S PIPELINES IN 2016/2017

PETROLEUM PRODUCT	QUANTITY METRIC TON	PERCENTAGE
CRUDE OIL AND CONDENSATES	22249	39.1%
MAZUT	8185	14.4%
DIESEL	14908	26.2%
GASOLINE 80	1239	2.2%
GASOLINE 90	1274	2.2%
GASOLINE 95	3490	6.1%
LPG	3894	6.9%
NAPHTHA	973	1.7%
JET FUEL	609	1.1%
KEROSENE	67	0.1%
TOTAL	56888	100%

TRUCKS

Trucks are mainly used for transferring gasoline, diesel, mazut, and LPG.

TRANSFERRED PRODUCTS BY TRUCKS IN 2016/2017

PETROLEUM PRODUCT	QUANTITY METRIC TON	PERCENTAGE
GASOLINE	4625	25.5%
DIESEL	8745	48.2%
MAZUT	2853	15.7%
LPG	1920	10.6%
TOTAL	18143	100%

WATER TRANSPORT UNITS

TRANSFERRED PRODUCTS BY COASTAL TANKERS IN 2016/2017

TANKER	QUANTITY THOUSAND METRIC TON	PERCENTAGE
EL NABILA 5	603	11.2%
EL SHARIFA 4	2273	42.1%
EL KESIA	2516	46.7%
TOTAL	5392	100%

LEADING INDICATORS

The total cost of transportation of petroleum products in Egypt increased by 6.5%, reaching EGP 19.3 billion in 2016/2017, up from EGP 18.1 billion in 2015/2016. Thus, the total transported quantities of petroleum products by various channels of transportation reached 147.1 mmt in 2016/2017, down from 150.4 mmt in 2015/2016, registering a decline of 2.2%.

It is worth noting that the highest petroleum products quantities were transferred by the Sumed pipeline, as it alone transferred 66.3 mmt in 2016/2017 at a transfer cost of EGP 37 per ton, compared to 65.8 mmt transferred in 2015/2016 at a cost of EGP 36 per ton, recording an increase of 0.7%. Meanwhile, the lowest quantities were transferred by railway tankers, which transferred 414,300 mt of petroleum products in 2016/2017 at a transport cost of EGP 87 per ton, compared to 446,100 tons in 2015/2016 at a cost of EGP 19 per ton—a decline of 7.1%.

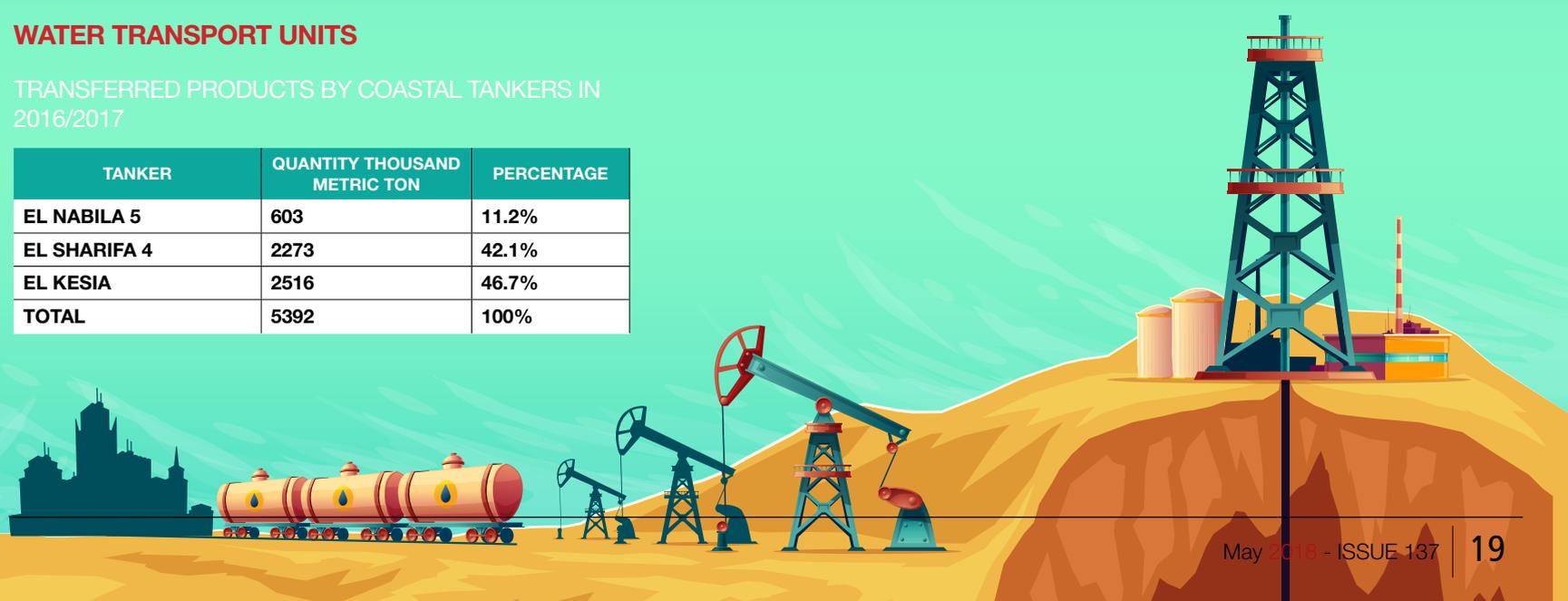
Moreover, the total transferred quantities of petroleum products, including crude oil, condensates, and LPG, through the PPC's lines reached 56.9mt in 2016/2017, at a cost of EGP 354, 180, 73, and 256 respectively. Meanwhile, the total transferred quantities through the PPC's lines recorded 61.1 mmt in 2015/2016.

As for trucks, the total quantities transferred by this channel increased by 3.2%, reaching around 18.1 mmt in 2016/2017, up from 17.6 mmt in 2015/2016. The transfer cost by trucks reached EGP 41 per ton in 2016/2017, compared to EGP 45 per ton in 2015/2016. While the transferred crude oil and other petroleum products by coastal tankers reached 5.4 mt in 2016/2017, of which 5.3 mt were crude oil and 0.1 mt were other petroleum products, at a transport cost of EGP 66 per ton.

THE QUANTITIES AND COSTS OF TRANSFERRED PRODUCTS BY DIFFERENT CHANNELS IN 2016/2017

CHANNEL	QUANTITY THOUSAND METRIC TONS	TOTAL COST MILLION EGP
RAILWAY TANKERS	414.3	36.0
TRUCKS	18143	743.9
SUMED PIPELINE	66294	2452.9
CRUDE OIL PIPELINES	20529	3695.2
CONDENSATES PIPELINES	1720	125.6
PETROLEUM PRODUCTS PIPELINES	30745	10883.7
LPG PIPELINES	3894	996.9
COASTAL TANKERS	5392	355.9
TOTAL	147131.3	19290.2

THIS REPORT IS BASED ON CAPMAS' FIGURES.





OIL & GAS GENDER DISPARITY: POSITIONS AND PROSPECTS FOR WOMEN IN THE INDUSTRY

By Felix Fallon

Affirmative action programs, those that attempt to redress diversity disparities in the workforce, are no longer the sign of a forward thinking organization, but are now a necessity for companies to show their efforts to amend the gender disparity in the workplace and reap the economic benefits of a diverse workforce. A 2015 report from the McKinsey Global Institute posited that if women enjoyed the same economic opportunities as men (known as “the full potential scenario”), the Middle East North Africa (MENA) region would gain \$2.7 trillion in gross domestic product (GDP) by 2025. However, female employment in the industry remains low, which raises concerns about whether ongoing steps towards female empowerment are enough to reduce gender disparity throughout the sector.

Gender Employment Gap

A 2017 report from the Boston Consulting Group disclosed that women constitute 38% of the workforce in major oil-producing nations. From this amount, 22% are directly part of the oil and gas sector. Once women get their foot in the door, however, the struggle against gender disparity is not alleviated. At an internal level, the report suggested that the percentage of women in the oil and gas industry drops

significantly - from 25% to 17% - between middle management and senior roles.

The report detailed the trend of female underrepresentation in the industry, which spans all levels and worsens significantly with rising seniority: women occupy 27% of entry-level roles that demand a college degree, 25% of mid-career-level roles, and 17% of senior and executive-level roles. Only 1% of the industry’s CEOs are women.

In international oil companies (IOCs), women represent 26% of employees; in national oil companies, they represent 13%; and in oilfield services and equipment companies, they represent 16%.

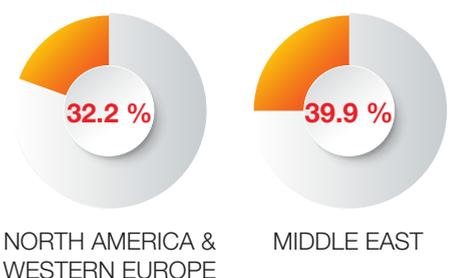
The underrepresentation of women in critical roles and job types is not necessarily indicative of industry passivity in the face of gender imbalance. Indeed, many companies have made concerted efforts to boost women’s presence in their organizations. However, the persistence of female underrepresentation indicates two possibilities: either the industry’s approach is too hands-off and not focused sufficiently on meaningful quantitative targets, or the quotas and affirmative action programs are not effective enough methods for achieving gender equality.

The STEM Factor

For mid-to-high level positions in any industry, appropriate credentials and significant experience are necessities; for the oil and gas sector, degrees in science, technology, engineering, and mathematics (STEM) form the educational basis for working in the industry. The ratio of men to women completing STEM degrees will influence the gender ratio in the oil and gas workforce.

Women constitute a relatively small portion of students in the world’s STEM programs - between 20% and 30%, on average. This is well below the level of female participation in

FEMALE PARTICIPATION IN STEM DEGREES



FEMALE SCIENTIFIC RESEARCHERS



tertiary education overall, between 50% and 60%. The culture of STEM study and work has long been characterized as male-centric.

The Middle East has a relatively high percentage of female participation in STEM degrees - 39.9%, higher than the 32.2% for North America and Western Europe, according to the 2017 "Women in Science" study published by Unesco. The study showed that 42.2% of Egyptian scientific researchers are women, higher than the global average of 29.9%.

A 2018 paper called "The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education" indicated that there are higher figures of female STEM work and study in regions such as the Middle East, where female autonomy and freedom is lower than that of the West, due to the fact that women in these regions seek the clearest possible route to economic self-sufficiency - which is often through STEM professions - rather than because of efforts made in promoting gender equality.

However, many women ultimately do not enter the job market or do not enter it in their field of study. This is largely because of social or cultural factors - such as the stigma associated with certain professions or types of work for women - and structural barriers, such as laws in certain countries prohibiting women from doing shift-based work, adding a further obstacle to the career path on top of the male-centric STEM environment.

In order to mitigate this issue, there have been concerted efforts from inside the STEM field to move away from the male-centric image and encourage more women to join. Countless universities have instituted STEM diversity programs, and in the West, the general thought has shifted away from attributing different gender-based skills.

Hiring Policies

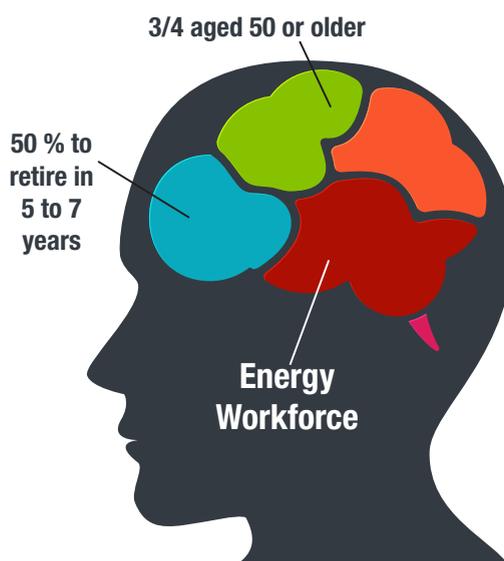
As consciousness of the gender employment gap is growing worldwide, the institutions that historically propped-up biases are taking note and beginning to play catch-up. Beyond the efforts being made to promote STEM education to women, some companies are implementing hiring policies to help close the gender employment gap.

Australian petroleum company Santos established a 50/50 recruiting target as part of an effort to increase the percentage of women in technical roles from 12% to 25%. In the same line, Shell has set a target of 50% women among the college graduates it hires. Chevron

equally has a 50% female recruitment target.

While quotas in most cases do increase numbers, the question has to be asked as to whether they are an effective stand in for gender justice, whether affirmative action programs are enough to redress the balance. If current policies such as this are upheld, gender disparity will diminish over time, but slowly.

In a 2015 article published in the Oil & Gas Financial Journal called "The 'Great Crew Change'", the nominative topic of an aging workforce in the industry is discussed. Nearly three-quarters of the energy workforce is aged 50 or older, and the American Petroleum Institute says that as many as 50% of skilled energy workers may retire in the next five to seven years. This event is commonly referred to as the "Great Crew Change." With a large turnover of employees expected in the coming years, programs such as Santos' will help institute gender balance at a much larger rate than they are currently doing. However, to take advantage of the opportunity provided by such a workforce shift, all energy companies would need to implement similar programs, as well as programs at the tertiary education level to encourage more female participation in subjects necessary to pursue such a career, which still see disproportionately low female enrollment.



The Career Plateau

Inside the industry, the environment seems to be stacked against women. The same Boston Consulting Group report analyzed the reasons why many women see their careers plateau while men see career advancement. In many cases, the problem stems from the workplace culture and attitudes regarding the higher-level capability of women. The report's interviews show that many women believe that the male-centric corporate culture limits their access to critical decision makers who have influence over their careers, making it far harder for them to gain visibility among these individuals than it is for their male colleagues.

One female executive interviewed by the report said: "It is often difficult for a woman to build the same relationships as a man could. It requires going golfing, drinking Scotch, or talking football. If you are a woman and not

doing those things, there is a glass ceiling, people are not comfortable with you, and you don't get close to them." Another commented: "If you don't like hunting or fishing trips, you're at a disadvantage." The historic corporate system, heavily topped by male figures, hinders female advancement, not necessarily in terms of intentional discrimination, but regarding the corporate relationships necessary for reaching high-level positions.

The report also detailed the biases about female leadership traits. Male managers are typically associated with 'harder' traits, such as being results oriented, self-confident, and competitive. Women, on the other hand, are associated with 'softer' traits, such as being collaborative, empathetic, and considered to be good listeners; both views corresponding with common stereotypes. Such biases matter, as many jobs emphasize the need for 'harder' traits typically associated with men and place women at a significant disadvantage when applying for senior positions.

The gender stereotypes and male community in the industry affecting female career prospects require a change in culture in both qualitative perceptions and quantitative promotion criteria to reshape corporate culture. For instance, actively including women in meetings, conversations, and workplace activities, therefore improving the opportunity for women to establish corporate relationships with the people who ultimately have a say on their career paths. Applying uniform standards on promotion decisions would also combat any decisions unconsciously affected by gender stereotypes. However, these are tasks easier said than done when concerning such ingrained discriminatory behavior and biases.

The widespread adoption of quotas and affirmative action schemes marks a movement in the industry to see change come to fruition down the line, but for the moment, oil and gas work is still heavily dominated by men and allows little female influence on the industry from higher-level positions. Over the course of time, as attitudes change and the current programs slowly edge the employment figures towards a more equal split, the culture preventing women from reaching the top of the career ladder will diminish - although this does not happen quickly.

Such programs should be a short-term solution helping to buffer the gender imbalance while cultural changes are being made such that affirmative action becomes obsolete. To make change quickly, the industry must further balance hiring policies, create targeted outreach programs to encourage women to join the industry, and collaborate with education institutions to increase female participation in STEM programs. To make effective long-lasting change that disseminates the - sometimes conscious, sometimes unconscious - discrimination against women, the industry must dig deep and look at the causes of such prejudices.



ENCOURAGEMENT & TRAINING: WELCOMING YOUNG PROFESSIONALS TO OIL AND GAS FIRMS

By Sarah Samir

Since Egyptian President Abdel Fattah El Sisi announced 2016 to be “the year of the Egyptian youth,” the state’s major economic sectors have been paying attention to young professionals. The oil and gas sector, in particular, has been taking significant initiatives to empower youth and help them draw their career path.

The sector’s companies are focusing interest on listening to younger generations, as well as on giving them the tools to turn their creative thoughts into technical, productive reality, further helping them enjoy equal opportunities and promotions.

Hiring Young Professionals

While people in the 20th century were competing to work in the thriving oil and gas sector, more recent generations are losing interest. About “14% of millennials say they would not want to work in the oil and gas industry because of its negative image,” according to an article by Christopher Handscomb; Scott Sharabura; and Jannik Woxholth, entitled “The Oil and Gas Organization of the Future.”

As the article explained, “millennials do not just want personal career growth; they expect to make a positive contribution to society,” concluding that “the 14% is the highest percentage of people uninterested throughout different sectors.”

In 2016, “approximately 21% of the oil and gas workforce was aged 55 or older,” according to EY’s article entitled ‘Recruiting during a Downturn’. Therefore, it became a big challenge for companies to replace this expertise.

Yet, as oil prices remain high, it is a chance for firms to understand “that their long-term competitiveness depends upon their ability to attract good talent today, and to address millennials, who will be the near future young engineers,” according to the article. Hence, oil and gas companies started to develop an interest in hiring new talents, training them, and helping them learn and gain experience.

For that purpose, some firms have developed new strategies to attract young professionals to join their teams. “Weatherford, for example, has been offering trainings for fresh engineers for years, where the company provides attractive packages during the training and after the hiring,” Haitham Fawzy, HR Supervisor at Weatherford, told Egypt Oil & Gas. The company further “provides attractive benefits like medical insurance, life insurance, car allowance, mobile allowance, and transportation for all staff,” he added.

Fawzy further stressed that Weatherford does not face challenges during the hiring process of young professionals and fresh graduates as the company provides “training program for fresh engineers to join, as well as other support functions that are available through social media and other recruitment websites.”

The company hires young engineers based on “their basic education, attitude, and culture during the interview phase, in compliance with the company’s needs,” Fawzy explained. “The company often faces some challenges in finding engineers for advanced/senior positions,” he pointed out.

In order to enhance the programs for young professionals, oil and gas firms should further address youth views and needs through identifying with their “culture, benefits, training, career planning, and the work environment,” to be able to attract millennials to work for them, EY’s article explained.

A Successful Path

Looking at attracting young cadres to the oil and gas industry, it became important for the firms to help their employees draw a clear path and climb the employment ladder.

“Weatherford Company had a specific job capsules, which are briefs for the job description for every single job and the requirements for any kind of promotion, as well as career path steps such as the needed

certifications, type of training, and years of experience,” Fawzy stated.

Upon meeting the requirements, a Weatherford candidate would “get assessed by the Performance Appraisal System and if [the candidate] received the Exceeding Expectations or Exceptional, then he gets promoted, if available, or switched to another department, or sometimes transferred to another branch abroad,” Fawzy continued.

It is important for oil and gas firms to develop the strength points of its employees to help them progress. “[The Middle East Oil Refinery (MIDOR)’s] management helped me develop my leadership qualities, increase my knowledge and improve my reporting skills through the completion of significant assignments,” Senior Coker Operation Engineer at Egyptian Projects Operation and Maintenance (EPROM)/MIDOR Refinery, Kareem El Semary, told Egypt Oil & Gas.

Following the same steps, Total Company helps its employees draw their career path through the support of “accessible human resources personnel, as well as job opportunities. All of the [Total] employees can leverage a range of tools and in-house contacts to build their own career paths,” according to the company’s website.

The French company boosts internal mobility, especially for its management positions. It further provides its people a job posting intranet, on which they can “submit an application for open positions anywhere in the world, with the assurance that they will receive priority consideration,” as the company highlighted.

During the preparatory trainings, “the main challenge is getting trainees to understand everything that they are being presented,” El Semary said. “Job trainings should be focused on providing the most essential information and making it easy to absorb ... Filling training with unimportant information is a waste of time and makes it difficult to focus on what is truly important,” he added.

Retaining Young Professionals

Besides programs to enhance young professionals’ skills, oil and gas companies should further give retention special attention. The first period of employment can be the most challenging for fresh-graduate engineers, which can be discouraging for the younger generations of petroleum employees.

“The type of the work environment in the oil and gas companies is a great challenge to deal with. Each person has to be aware of it and follow the company’s procedures in order to maintain plant conditions within safe operating limits. A person has to determine the severity of problems, troubleshoots, and resolve or refer to appropriate technical staff to determine root cause analysis and correction,” El Semary explained.

Additionally, it is vital for every person working in the oil and gas field to understand “the importance of safety procedures and not to improvise, which could be a new thing for fresh graduates, and could discourage some youth from continuing to work in the sector,” he noted.

However, young professionals do not usually seek quitting their jobs, and most of those who do, quit for better job offers, as Fawzy said. “The company could help [the youth] by developing [the young employees’] skills and enhancing their experience with the ongoing training and coaching. In addition, there must be a clear career path with a list of requirements that are applicable and running on the actual basis, which is the most powerful tool not only to retain them, but also to motivate them while they are working in the company.”

With training and engagement, oil and gas companies can reach out for younger generations, address their needs, and help them make profit out of their creative, ongoing train of thoughts. The firms should further help employees grow in their career path, and thus, benefit the industry at large.

“There must be a clear career path with a list of requirements that are applicable and running on the actual basis.”

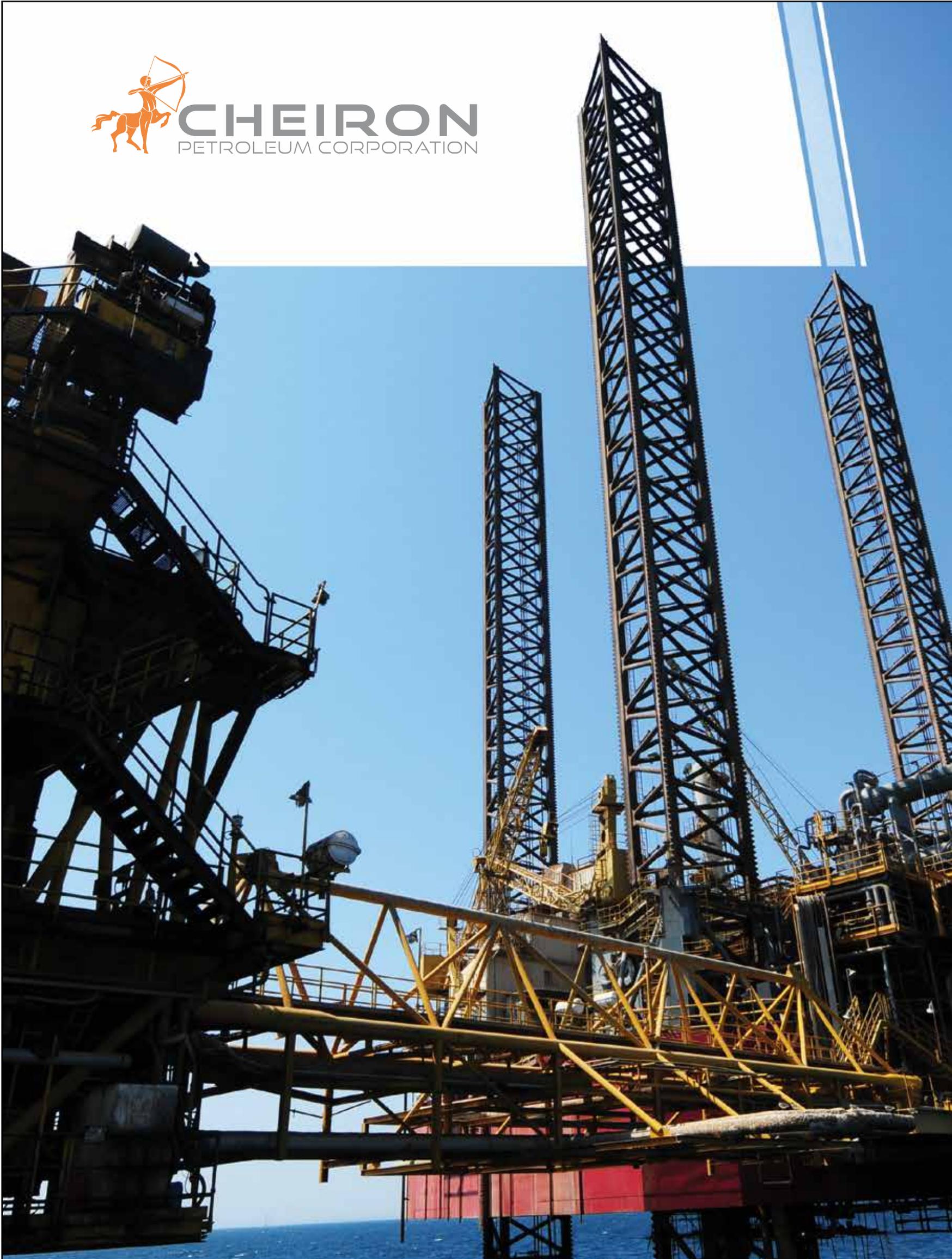
HAITHAM FAWZY, HR Supervisor at Weatherford

“Job trainings should be focused on providing the most essential information and making it easy to absorb.”

KAREEM EL SEMARY, Senior Coker Operation Engineer at EPROM/MIDOR Refinery



CHEIRON
PETROLEUM CORPORATION



LEVERAGING MATURE FIELD **SKILLS** BUILDING A GROWTH **PORTFOLIO**

CHEIRON is the largest Egyptian independent E&P company with operated production levels of around 50,000 boepd, which are set to grow further. The company is focused on applying cost effective solutions, new technologies and international safety, environmental and social standards to add value across its asset portfolio. In Egypt, the portfolio includes mature fields in the Gulf of Suez, waterflood projects in the Western Desert and a new gas field development in the Mediterranean. Internationally, the company holds assets in Mexico and Romania.



BOOSTING YOUNG PROFESSIONALS' SKILLS:
***THE PRIVATE SECTOR'S ROLE IN
PROVIDING WORKPLACE EXPERIENCE***

By Matthew Hoare

The gap between the skills learned by Egyptian students and the real-world demands of the private sector is not a new phenomenon. The problem has been a recurring subject of discussion among industry experts and is particularly pronounced in technical areas such as petroleum engineering that require students to undergo time and resource-intensive training in order to develop the necessary skills.

Although it is the responsibility of universities to equip their students with the technical knowledge necessary to flourish in the industry, real-world experience is arguably of equal importance in promoting the development of individuals' practical skills. Temporary work experience placements and internship programs in the private sector could therefore be critical in helping to address the gap that exists between education and employment.

The Benefits of Workplace Experience

A 2010 report published by the Organization for Economic and Cooperation and Development (OECD) provides a detailed breakdown of the benefits of workplace training for students and private sector employers. The OECD argues that real-world experience is actually more effective in helping to develop both the hard and the soft skills of students.

The development of hard, technical skills is particularly relevant in a technology-driven profession such as petroleum engineering, in which rapidly-evolving technology causes knowledge and practical techniques to change and become obsolete.

However, universities may not have the ability to continuously update their equipment, and in-house staff may not always be able to keep on top of every innovation in the industry. In comparison, private sector companies are more likely to have access to the latest cutting-edge technologies and employ specialists that are able to train new staff on how to use them. National oil companies (NOCs) and international oil companies (IOCs) are therefore better positioned to educate students in this area.

Students also benefit from the experience of using soft skills learned in the classroom and applying them in real-life situations. This helps students transition their skills such as communication and time-management from the classroom into the professional environment, and helps them adjust to the demands of working life when it is time for them to seek employment.

Real-world experience is more effective in helping to develop both the hard and the soft skills of students.

From the perspective of the private sector, there are both productivity and recruitment benefits to be gained by offering work experience placements and internships. Firstly, companies stand to benefit from the productivity of having trainees and students working temporarily for the company. Longer placements will produce the biggest productivity benefits for companies; not only because of the length of time, but because the value of the individual's contribution will increase as they become more experienced and their skills improve.

Secondly, employers gain an advantage over their competitors by being able to select promising young

talent from among the pool of trainees hosted by the company. Viewing trainees as potential future employees provides an incentive to employers to emphasize the training and development of the individual, rather than looking at them as a source of cheap labor.

The Current Landscape

Currently, both IOCs and NOCs provide workplace opportunities to young engineers and technicians. These take the shape of either graduate schemes or internships targeted at students still pursuing their bachelor's degrees. Some companies design their work experience schemes specifically for Egyptian students, while others open applications to international students. Programs targeted at Egyptian students are more likely to address the current concerns of the domestic industry, whereas international schemes, given the far broader demographic, are unlikely to have as big of an impact on the skills gap.

Shell Egypt's 'Early Year Internship' program provides non-graduates an option to gain first-hand experience of working within a major IOC, while Total Egypt offers a three-month training program for Egyptian undergraduate students. Apache likewise invites undergraduate students to submit a resume and apply for an internship with the company. Workplace programs are also available at certain Egyptian NOCs; the Petroleum Projects & Technical Consultations Company (Petrojet) hosts a summer training program for undergraduates each year, while Egyptian LNG's Fresh Graduate Program provides a two-year internship that offers an extended opportunity for students to enhance their practical skills.

Several companies also run programs designed to educate engineering graduates in the business, economic, and managerial aspects of a company. ENI's Scuola Enrico Mattei, for instance, runs a Master Degree in Management and the Economics of Energy and the Environment (MEDEA) open to international students specializing in technical, scientific, and economic fields. The program offers two paths for students to take depending on their specialisms: the 'managing technical assets' path trains technical and scientific students in logistical and operational areas while the 'global energy' path is targeted at graduates of business engineering and business economics, and focuses on managerial aspects of the industry.

Ayman Elbendary, a reservoir engineer at Italian oil company ENI, took part in the MEDEA program following his completion of a five-year engineering undergraduate degree at Suez Canal University. During this degree - which encompassed drilling, reservoir, and petroleum engineering - he was able to complete three different internships with Belayim Petroleum Company (Petrobel) and Oasis Petroleum Company (Oapco). This consisted of a one-month obligatory summer internship sponsored by the university followed by two extracurricular placements. He told Egypt Oil & Gas that getting a first-hand look into the day-to-day workings of an oil company was an important experience for him. "I saw how people worked, I saw the water injection plant, how they were treating water... During [the third internship] I was able to see the pumps, the troubleshooting process."

While Elbendary managed to gain experience in several companies during his degree, some industry figures believe that undergraduates do not have enough opportunities to put the theory into practice during their time at university. Engineer Osama Halim, Halliburton's area manager for Egypt and Libya, told Egypt Oil & Gas that "young professionals lack practical application of their theoretical studies in university." For Halim, this is where workplace experience comes in. "[The lack of practical

application] can be offset with structured internships and summer programs," he says.

Halim, however, says that the presence of a gap between education and practice is normal. This is because the primary role of a university is to provide students with a grasp of the theoretical basics. It is when students enter employment in the private sector that theory can be transitioned into the development of practical skills. Elbendary echoes Halim's observations. "Universities just give you the foundations, the basics of engineering," he said.

Private sector companies are more likely to have access to the latest cutting-edge technologies and employ specialists that are able to train new staff.

Making Work Experience More Effective

While there may always be a gap between students' experiences in university and the realities of the private sector, there are still ways in which internships can be made more effective in giving students the practical knowledge they need to succeed in the industry.

Halim suggests a number of ways in which the private sector can engage with undergraduates in order to ease their transition into the workplace. They can "sponsor graduation and research projects, encourage internships and conduct technical sessions". Instead of one-time internships, Halim says that work placements should take place over an extended time period and involve intensive training programs. Furthermore, these programs "should be specially designed with ample commitment for offline projects... this would enable a comprehensive evaluation and assessment" by the host company.

There may also be a need to rethink, not just the structure and availability of internships, but their pedagogical focus as well. Asked how work placements may be improved for future students, Elbendary says that there should be more focus on working with computer systems; in particular software used for data processing and analysis. "I had big trouble with this," he admits. "It would be better if students were taught more about big data." Given the rapid development of new technologies and information systems and the limited resources of some universities, data processing and analytics may prove to be an important area for increased private sector involvement.

The responsibility for improving work experience opportunities does not just land on the shoulders of the private sector, however. There must be effective collaboration between the private sector, government bodies and universities - both public and private - if significant changes are to be made. The current levels of coordination between these sectors is "definitely lacking", according to Halim. When asked about his prescriptions, he urges the private sector and universities to "engage in one-on-one dialogue to design the internship processes and programs". While he acknowledges that this process will require commitment from all parties, it must be achievable if the current workplace system is to improve.



Student Activities & Education Improvement: The Silver Lining for Governmental Petroleum Engineering Students

By Menan Khater

Following the beginning of production from Zohr natural gas field and the historic agreement with Israel, the oil and gas industry in Egypt is going through a prosperous phase. In order to sustain the country's achievements and meet the government's expectations of turning Egypt into an energy hub, the Egyptian petroleum sector requires more technical engineers with practical experience. For this matter, activities that allow students to break the academic routine and prepare them for the job market have become common.

Although national and international oil companies often take the initiative to promote this kind of programs, anticipating the market's challenges has been a major concern for engineering faculties and students. In Egypt, the Society of Petroleum Engineers (SPE) sets the example as a strong student organization that addresses the young professionals' needs to fit the market, through which a great amount of students gain technical experience and find job opportunities. However, students and professors also point out the need to change the education system in order to provide the new generation of petroleum engineers with more assertive skills.

Conventional Education

Closing the gap between education and practice in order to enhance young professionals' skills

often means breaking with conventional methods of education. "Students get the basic technical knowledge during their university study, but in order to land a job in the sector, there should be more training opportunities in the field," Dr. Mahmoud Abu El-Ela, Professor of Petroleum Engineering at Cairo University, told Egypt Oil & Gas. "The only thing that needs to be developed [in the faculty's education program] is the training... there should be more training opportunities," he added.

Students at governmental universities are particularly dissatisfied with the level of practical training and overall teaching methods. "To get a good grade, I have to follow blindly what the professor asks me to do. It is not about my mentality or skills. If I were to use a different method than the academic textbook, even though it might be valid practically, my grades would be deducted drastically," said Mohamed Yasser, a third-year Student at Faculty of Petroleum Engineering at Suez University.

Yasser, who travels about 137 km from his home to attend his lectures in the upscale neighborhood of Heliopolis to Suez University, said he preferred to join this campus specifically despite the distance. The level of education did not meet his expectations, however, despite Suez being the most prestigious public university for petroleum engineering.

"The first time I got to learn a major-related subject was in my third semester," he said. "The technical

subjects, such as logs, are only in the 4th year, which means if I got any training opportunities earlier, I would not be able to fully benefit from it."

However, the situation differs from one governmental university to another. "Unlike other governmental universities like Suez and Cairo, we study more general subjects," Awad El-Badran, a senior student in the Faculty of Petroleum Engineering at Azhar University, told Egypt Oil & Gas. "We do not just depend on specialization, such as drilling... we get a more comprehensive overview on things, and this qualifies us better than other graduates," he stated. "The only drawback is that university labs need to be developed," El-Badran noted.

Due to the lack of internships, many graduates must learn additional skills that might not be entirely related to their academic knowledge in order to land an internship.

"Some private companies' announcements require only students from AUC [American University in Cairo]. Even though I have excellent grades, so far I cannot enter the company," Zakaria Abdelfattah, third-year student in the Faculty of Petroleum Engineering at Cairo University, and team leader at the Society of Petroleum Engineers, told Egypt Oil & Gas.

"When I tried once to propose an official training request for Cairo University students to one of the

private oil companies, an employee responded helplessly that they receive hundreds of applications annually, only from third-year students," Abdelfattah explained. "You could try to get a recommendation letter from an employee in order to get an opportunity for the next training group," he quoted the employee as saying.

Creativity Outlet

The Society of Petroleum Engineers, an international non-profit organization comprising a network of students, young professionals, and veterans in the industry, provides opportunities to students to participate in extra-curricular activities to enhance their post-university career prospects.

SPE has different chapters in Egyptian universities, where hundreds of students apply to join every year. The organization is seen by students as a way to help them stand out and keep pace with the oil and gas industry's rapidly-changing landscape.

Becoming a separately incorporated organization in 1985, SPE aims to collect, disseminate, and exchange technical knowledge concerning the exploration, development and production of oil and gas resources and related technologies for the public benefit. By 2014, SPE's network reached 124,000 people, according to their official website. The organization also provides opportunities for professionals to enhance their technical and professional competence.

"SPE provides both technical and non-technical sessions, trainings, and field trips," Abdelfattah, SPE Cairo University President, said. "In the petroleum sector, everyday there is a new update, new tool, new technique, our role is to bring people all the most recent updates that they would never learn about in university," he noted.

"Meanwhile, the non-technical sessions aim to improve the students' soft skills in order to encourage companies to hire them," Abdelfattah further stated. At least 150 people apply every year, not all of them are studying petroleum engineering. The team includes multiple disciplines of engineers, geologists, scientists, marketers, and administrators. "The structure of the team itself is divided as corporates. We have HR, marketing, sales, and they have top managers. This enables the students to learn as well the workflow inside companies," Abdelfattah explained.

Besides the technical and non-technical sessions, SPE Azhar University team provides a community service. "The second branch is the community. We organize field visits to hospitals, cancer patients, schools etc.," El-Badran, SPE Azhar President, said. The turnout in applications for the current academic year was 90 students from multiple disciplines, El-

Badran noted.

When he first joined SPE Suez team, Yasser was tasked with participating in and preparing a magazine related to sector updates. The following year he was responsible for the entire magazine. "Despite our lack of resources and few members, we received a positive feedback and this motivated me to apply this year as a president," Yasser said. "After I was elected, it felt like a huge responsibility in order to meet the team's expectations, but we managed to upscale SPE Suez's impact in an unprecedented way," he said. "This year, the magazine was sponsored by three companies and was distributed during the Egypt Petroleum Show (EGYPS 2018)," Yasser explained.

Regarding the technical knowledge, Yasser said that "we managed to get a license to operate a smaller version from a software used in one of the IOCs, to be accessed and used by our students in the labs." SPE teams typically organize panel discussions by CEOs to talk about the changing industry, and they try as well to organize training opportunities for a number of members that are carefully selected. In Cairo University, for instance, there are partially-funded exchange programs abroad.

While SPE does not directly send students to participate in private sector internships, it empowers them with needed skills and background to fit the competitive nature of those internships. "It helps the students gain a wide range of skills, such as advertising, marketing, conference and event management," Dr. Abu El-Ela said.

Turning Point

While attending a lecture on an advanced technique, Abdelfattah interacted with the professor and demonstrated that he had already learned about the topic through his work with SPE. "The professor was impressed to see me familiar with enhanced oil recovery," he said, noting that the technical sessions focus on how things work from the industry's perspective, while providing insider tips.

This year, Abdelfattah landed his first job at a shadowing opportunity at Schlumberger. "There was a competition organized by the company asking the participants to submit a field development plan. My experience in SPE culminated in this competition... It helped me create a strong and diverse team, besides the technical background... We won second place," he said.

For Yasser, his experience with SPE equipped him with solid communication skills. In addition, he booked himself a spot for an internship with ADES, a prestigious drilling company. "One of the main reasons I got accepted was because the interviewer

was a former student activity member, so this helped the company understand my potential," Yasser said. "I also consider myself lucky to join an internship related to drilling as it is one of the hardest subjects in my university," he added.

Whereas, the most useful gain for Awad was the network. Despite being a senior, he did not manage yet to get a training opportunity. However, he asserts that there is a significant difference between him and other colleagues after joining SPE, especially in terms of the professional network and technical knowledge.



In the petroleum sector, everyday there is a new update, new tool, new technique, our role [SPE] is to bring people all the most recent updates that they would never learn about in university



ZAKARIA ABDELFAH, SPE CAIRO UNIVERSITY PRESIDENT

"The thing that was useful most is the network with industry people, companies and engineers. Additionally, there is an obvious difference between me and people who did not join SPE and used to think it is a waste of time. When someone discusses a topic, I respond and interact. Other students ask me to build their CV," he said. "As a senior, I am now reassured that my past years in SPE were not in vain."

The students' experience in SPE exemplifies the game changing potential that these organizations have in the entire oil gas industry, as it brings a new generation of highly capacitated employees and decision makers. It further enables students to acknowledge the real needs of the market and accordingly address them within their universities, inspiring the most needed changes to enhance education in Egypt's engineering faculties.

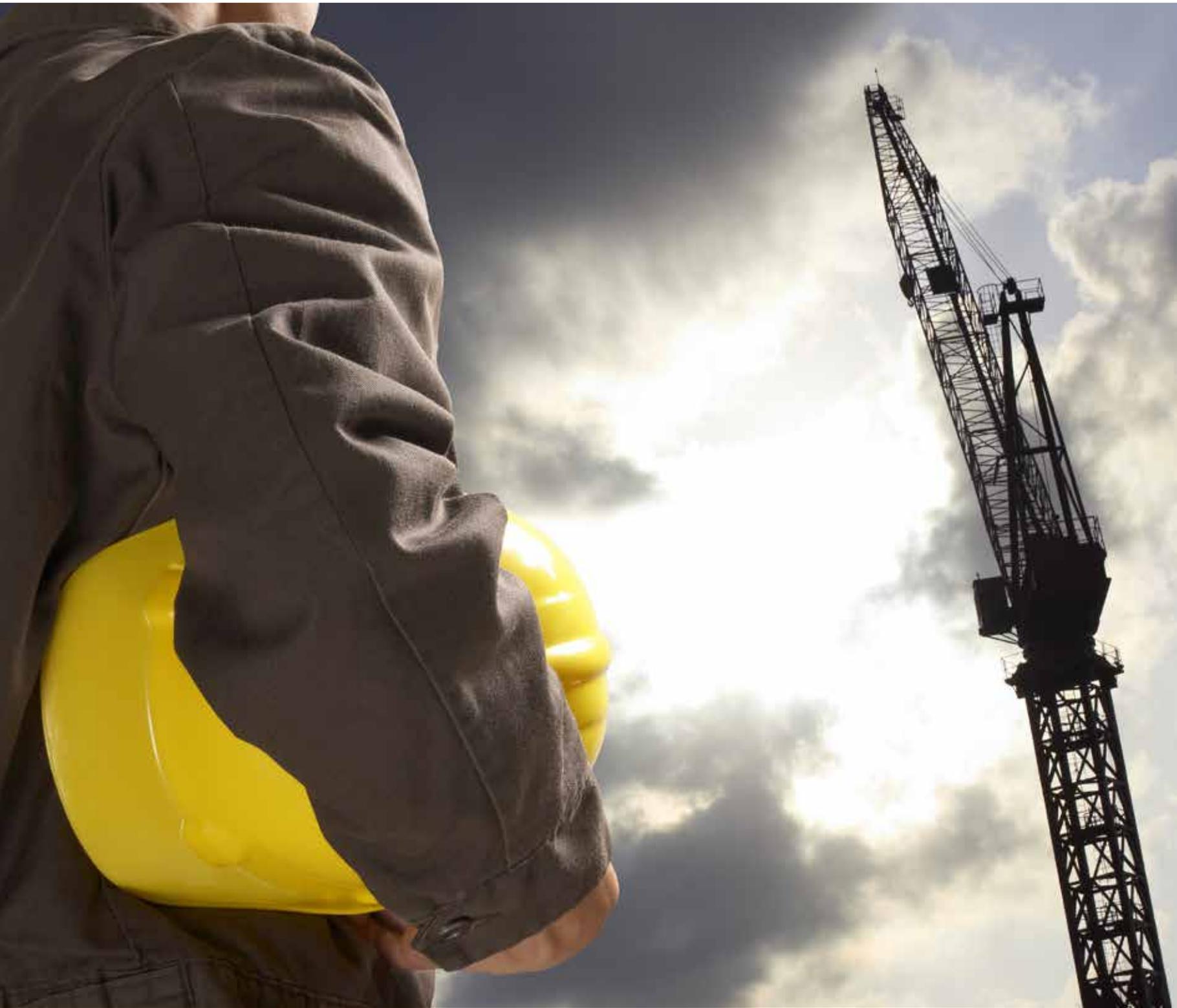


Students get the basic technical knowledge during their university study, but in order to land a job in the sector, there should be more training opportunities in the field.



DR. MAHMOUD ABU EL-ELA, PROFESSOR OF PETROLEUM ENGINEERING AT CAIRO UNIVERSITY





Working on the Rigs THROUGH THE EYES OF JUNIOR FIELD ENGINEERS

For petroleum engineering fresh graduates, the career choices they make do not only affect their career path, but also their lifestyle. Going for a field-based job means having to spend long periods in remote fields with minimum level of living facilities, long shifts, and stressful working environments. This

work/life balance was one out of three main reasons why petroleum workers quit their jobs, according to the 2013 Global Retention Survey by RIGZONE. "I was excited for the first couple of months, then felt frustrated for another couple of months, and then I started to work on figuring out how to get adapted to rigs life. Yet, every day I am still thinking whether I

should continue in this career or not."

This is how M.A., junior field engineer at one of the international oil companies (IOCs) operating in Egypt, described his experience of working on rigs to Egypt Oil & Gas. The phone interview with M.A. was interrupted many times due to the weak connection on his side as he was on an offshore rig

in the Mediterranean. No surprise that he pointed out to the lack of proper communication method as one of the challenges he faces as a field engineer. After talking more about rigs life with field engineers, communication issues sounded to be a minor challenge compared to other working conditions.



In one of the internships I attended, the supervisors did not give us the safety uniform, so we would stay away from the equipment and not interfere in the work.

OMAR OSAMA, Field Engineer

Most Challenging Conditions

"Sometimes there is no caravans to sleep in. The food sometimes is not good, but you have to eat to have the energy to work. It is a completely different lifestyle from living in my house," Omar Osama, field engineer at an IOC, explained to Egypt Oil & Gas.

"The work is really tough and demanding, so even if there is no place to sleep, I'll just sleep in a chair," M.A echoed Osama.

Ola Hussein, field engineer at another IOC, agreed with Osama's statement regarding the difficulty of finding a place to sleep in. The situation is more difficult for her considering that, sometimes, she is the only female in the site. "Female engineers usually face this problem of not finding a place to sleep in. Places are already limited on the rigs, but since I am sometimes the only female in the site, my workmates have to leave a whole caravan, which accommodates three to four people, for me as there is no individual caravans," Hussein added.

Working hours is another challenge that field engineers face. "I have to be alert at any moment during the whole period I spend on the rig, which varies from few days to a week. I almost don't sleep during this period," Hussein said.

"My work is shift based. My shift is 12 hours; however, if the workload is heavy I work for more hours. In such situations, I might sleep for couple of hours after my 12-hour shift and then continue working. But there are some days with lighter workload as well," said M.A.



Female engineers usually face this problem of not finding a place to sleep in. Places are already limited on the rigs, but since I am sometimes the only female in the site, my workmates have to leave a whole caravan for me.

OLA HUSSEIN, Field Engineer

Technical Challenges

Field engineers have to deal with heavy equipment, sensitive tools, and giving instructions to workers. These aspects of the field work represent another challenge to fresh graduate engineers.

"The field work sometimes requires physical work that I cannot do while my male counterparts can do easily. At first, this was really challenging for me, but then I felt okay to say that I cannot do this on my own and I need workers to do the physical part for me," Hussein said.

Hussein described being a female is the most challenging part of her field work. This becomes more evident when she has to give instructions to workers. "You really have to have strong personality and balance between being bossy and being weak to get male workers who are older and more experienced than you follow your instructions," she added.

The rigs blue-collar workers are not necessarily educated; however, some of them have been doing this work for years. This makes it challenging for the young engineers to give them instructions on how to follow new techniques.

"Sometimes, individuals in the field would say that following the safety instructions makes things more complicated and time consuming. This might be true; however, following the safety measure saves lives, which is what you cannot compensate," Osama said. "It is really hard to convince a 60-year old worker that what you need to do things differently or to do something new," Hussein echoes Osama.

For Osama, giving instructions to workers is the most challenging part. "Being responsible for the workers you work with is something new for me. It fits my personality and it is not difficult for me; yet, it stresses me more than what I have expected," Osama said.

Preparation for Field Work

Doing summer internships and training is a prerequisite for graduation in all the Egyptian petroleum engineering schools.

"At Suez University, the department is responsible for offering internship opportunities for students in companies. We communicate with companies and get their permission, and allocate the students according to the number of internships the companies offer," said Ashour Owais, Dean of Faculty of Petroleum and Mining Engineering at Suez University, to Egypt Oil & Gas.

It is important for students to attend training both in the office and the field; however, not all the students, especially female students, are able to get practical internship, as Ahmed ElBanbi, Chair of Petroleum and Energy Engineering Department at the American University in Cairo, told Egypt Oil & Gas.

"I did many internships when I was an undergraduate, but all of them were office based. I had the chance to visit a field only once when I was in the United Arab Emirates, but it was only one day, so it doesn't really count," Hussein said echoing ElBanbi.

Osama had a different experience when he was an undergraduate as he was exposed to the field. Yet, he did not have the chance to do any of the work. "In one of the internships I attended, the supervisors did not give us the safety uniform, so we would stay away from the equipment and not interfere in the work," he said

Suggesting Better Preparation

Owais believes that universities should offer their students more on campus extracurricular training courses as the students need these courses along with the field internships. These courses will help them get the full picture about the industry, as he disclosed.

Currently, some of the petroleum engineering fresh-graduates and students enroll in such courses after graduation in off campus training centers. "We are now trying to coordinate between one of these centers to offer these course to Suez University students. If this protocol is put into action, Suez University students will be able to attend these costly courses with reduced fees," Owais stated.



What we can do in universities is to recruit professors with both strong academic and practical experience.

AHMED ELBANBI, Chair of Petroleum and Energy Engineering Department at AUC

For ElBanbi, the process of preparing the students to the field is a shared responsibility of both educational institutions and the petroleum industry itself. "What we can do in universities is to recruit professors with both strong academic and practical experience. If he/she has done the real work before, then the way he/she explains [working] conditions to students and design the course and the assignments will be different, will be very practical," ElBanbi explained.

He further believes that the national and international oil companies (NOCs and IOCs) should help the students to be exposed to the field. "The industry itself should do its part in preparing students to join it. If the opportunities for training are limited, then it is difficult for the students to understand the working environment," ElBanbi added.

From his experience, ElBanbi noticed that structured training programs are more helpful for the students than the training programs in which students have to supervise the process. "If the students have to do specific tasks during their training and have to deliver something such as presentations, calculations, or report to their supervisors during the training, that makes the outcome of the training tremendous," he explained.

The Fruits of Working on Rigs

"I have learnt things that I would not have learnt ever in the office. Working in the field definitely honed my technical background... on the personal level, I started to be more confident and decisive. Also, it helped me to learn how to deal with people from completely different background," Hussein said.

Osama believes that working in the field is a must for him to achieve his career goals. "I think I am young now and I have the mental and physical abilities to endure the tough working conditions on rigs. If I do not do that now, then, I will not be able to do it later in my life," he added.

Hussein, Osama, and M.A agreed that despite working on rigs is challenging, it is worth it compared to how much they learn on the professional and practical levels. In addition, the financial compensation for field-based jobs are higher than the salaries of office-based jobs in the petroleum industry.

Proactive Steps towards

FEMALE EMPOWERMENT WORLDWIDE

By Omnia Farrag



While the public and private energy sectors address the gender disparity among employees through setting quotas for female workers and promoting internship programs targeting women, female-led initiatives and non-governmental organizations (NGOs) have concurrently taken the significant steps towards a more diversified oil and gas sector. These initiatives and NGOs give women a valuable space to speak about their involvement in the sector, which helps in understanding the reasons behind their underrepresentation and acting upon them.

Egypt Oil & Gas talked to NGOs that support females in the energy sector in different places in the world in order to understand the role of civil society in achieving gender parity in the male-centered energy industry.

Initiatives Worldwide

Under the slogan of “Awakening Women’s Potential in Oil, Gas, and Mining”, the Association for Women in Extractives and Energy in Kenya (AWEIK) aims to provide Kenyan women with the opportunities of professional and economic development in the extractive industries. AWEIK does so through highlighting and addressing socio-economic challenges that confront women in the sector. It adopts several strategies such as movement-building, advocacy, lobbying, and supporting women collective actions.

AWEIK is an independent organization. However, it works closely with the Kenyan government and the private sector to establish the participation of women in investment opportunities, decision-making processes, and professional growth in the petroleum sector, as Michelle Mwambela, former Coordinator and current active member at AWEIK, told Egypt Oil & Gas.

“AWEIK is working to ensure that its members have a seat on the ‘decision-making table,’ this being policy and legislative discussions. This aims to ensure the inclusion of women across all value chains, be it at the professional level (engineers, project managers, lawyers, etc), business level (suppliers) and community level,” Mwambela explained.

Moving to the US, Egypt Oil & Gas talked to the President of the Association of Women in Energy (AWE). AWE’s mission is to “encourage and unite women in energy”, according to the association’s website. It is dedicated solely to empowering women in the energy industry by providing opportunities for women to meet other energy industry professionals

and to enhance their knowledge of the industry.

“AWE sponsors annually a Power Matters Conference which addresses and encompasses current energy-related issues,” AWE’s President, Becky Motal, told Egypt Oil & Gas. AWE’s Board is purposely comprised of women and men who are in senior executive positions within their own companies or organizations, Motal added.

The organization perceives the collaboration between AWE in one hand and the private and public sector in the other as a two-way channel. “AWE utilizes the expertise of these industry recognized leaders to assist women throughout the industry with real-life examples of succeeding in a complex, broad industry.... [They] provide personal experiences of challenges encountered over their careers, thus helping women in the industry better understand strategies and paths to success,” Motal explained. AWE’s Board members further bring the AWE values and purpose back into their own organization to complement any “female empowerment strategies” within their individual organizations, she added.

In Australia, Women in Oil and Gas (WIOG) works on supporting females in the petroleum sector through its events and activities. WIOG intends to increase women’s awareness about their opportunities and career path in the oil and gas sector. It aspires not only to attract talented women to the sector, but also to retain them through networking with the private sector and universities.

“The private sector works closely with Women in Oil and Gas by providing venues and speakers for WIOG’s very popular events. There is also a branch of WIOG at the University of Western Australia,” Sally Male, Advisory Council Members at WIOG, informed Egypt Oil & Gas.

In the UK, POWERful Women was surprised by the results of its own study, which was conducted in collaboration with PwC in 2015. The research showed that only 5% of executive board seats within the top UK-based energy companies are held by women, while 61% of the companies have no women on their board. Since then, POWERful set the goal of achieving 40% of middle management and 30% of executive board positions to be female by 2030.

Campaigning and reporting, supporting women in their careers, and sign-posting practical support to increase diversity are the government-supported initiative’s main strategies to accomplish its objective.

POWERful Women works in collaboration with the British government, industry leaders, and women who are in or aspiring to be in the industry, Francis Gugen, Founder Member in POWERful Women, told Egypt Oil & Gas. “We are a UK only initiative, but we do have some links with other similar initiatives elsewhere, such as MERM in Mexico, and Pink Petro in the US,” Maria Blakley, Project Manager at POWERful Women, added.

Challenges Faced

Although these organizations walk towards the same objective, each one of them points out distinct challenges. As for AWE, Motal believes one of the main challenges that the organization needs to overcome is how women in the energy sector themselves perceive their job. For this, AWE helps women recognize the need to take the time to occasionally focus on broader, external issues to their own respective job focus, as Motal stated. “It is important to help them understand it is equally critical to focus on one’s industry and not singularly on the job at hand. The challenge is to help them see beyond the ‘silo’ of their respective position and ask questions as to how and why their job fits in a bigger energy picture,” she further explained.

From POWERful Women’s perspective, the main challenge faced is how to convince the industry leaders with the importance of diversity in their companies’ board, Francis Gugen said. Additionally, Gugen notes the challenge of “encouraging influential leaders to strive for and manage change in a systematic and organized fashion as would happen with any other business transformation.”

The low percentage of female engineering students, 18% in Australia, along with the high turnover of female employees in the petroleum sector, are the main challenges that WIOG faces, according to Male, who is also Engineering Education Chair at The University of Western Australia. “[The percentage of female engineering students] has remained relatively stagnant. Furthermore, women leave the profession at higher rates than men in their late 20s. Workplace culture is known to be a key factor,” Male explained.

WIOG supports employers to improve inclusion by example. It works to solve these problems through providing both employers and female employees with examples of successful women and professional development opportunities for female employees, as Male further elaborated.

As for AWEIK, Mwambela believes that the culture



AWE utilizes the expertise of these industry recognized leaders to assist women throughout the industry with real-life examples of succeeding in a complex, broad industry.



BECKY MOTAL, AWE’S PRESIDENT



WIOG provides numerous female role models as speakers [in its events], as well as leaders of cultural change in organizations in the industry.



SALLY MALE, ADVISORY COUNCIL MEMBERS AT WIOG



The areas within which oil and gas are extracted are far flung and remote, making it difficult to have active presence and influence within communities where petroleum is extracted.



MICHELLE MWAMBELA, FORMER COORDINATOR, ACTIVE MEMBER AT AWEIK

perception of the petroleum industry as male-led has slowed down the uptake and acceptance of AWEIK's work. However, this is not the only challenge AWEIK is encountering. "As a young organization, about a year and a half old, AWEIK faces financial challenges in implementing its activities and strategic plan. Moreover, the areas within which oil and gas are extracted are far flung and remote, making it difficult to have active presence and influence within communities which petroleum is extracted, Mwambela added.

Proposed Actions

In order to overcome the challenges and meet the final target of enhancing female participation, Becky Motal emphasized the importance of collaborative actions amongst women in all the branches of the energy industry. Additionally, she encouraged CEOs to broaden the knowledge of female employees with exposure to broader corporate issues, so that they become efficient parts of the company's managerial board in the future.

"My advice for any women wanting to create similar initiatives is to establish a group, board or advisors of 'women leaders' in the petroleum industry or the broader energy industry. I would encourage seeking the assistance of male CEOs or other executives who understand the value to them and their organizations of utilizing the skills of talented women they have employed," Motal said.

Mwambela echoed Motal regarding the importance of collective actions amongst women. "The power of collective bargaining and negotiation cannot be gained," she said. She further advised female engineers to focus on capacity building and networking of women across all value chains of the petroleum sector, as this promotes knowledge exchange and experience sharing.

"Creating partnerships with similar organizations may help and you can share the costs of events that way. In my view events make you visible," POWERful Women's Blakley said.

Blakley believes that running these initiatives is challenging, but potentially very rewarding. "It helps to form a committee or board and to allocate operational roles such as 'events coordinator' or 'membership secretary' and to have regular scheduled meetings ... It also helps to enlist support from senior professionals in the industry and the government and have them on the board or committee," she said.

WIOG's Male believes that not having large membership fees helped the organization to attract more members to it. "In the WIOG model, the employers in the sector support activities financially instead of individual membership fees," she explained. In this line, Blakley suggested sponsorship packages for funding the organization.

Breaking the Stigma

The four organizations agree on the importance of highlighting women's success stories in the field to prove the importance and the feasibility of including



them in the sector. WIOG and POWERful showcase examples of successful women in the petroleum industry during their events and in their publications.

"WIOG provides numerous female role models as speakers [in its events], as well as leaders of cultural change in organizations in the industry," Male said. POWERful Women's Gugen echoes Male when it comes to promoting successful stories of female role models. POWERful Women demonstrates the business success of companies that have embraced diversity in their board, so that other companies can follow their lead.

Additionally, the company provides its audience with the recent statistics on the performance of companies that have female board members in order to prove the organization's case. For example, POWERful Women highlights McKinsey's study, published in 2015, saying that companies in the top quartile for gender diversity are 15% more likely to have financial returns above their respective national industry medians.

AWEIK follows a similar strategy. Its petroleum sector membership is dominated by professional women working as engineers, management, and lawyers within the petroleum sector, according to Mwambela. "[It] encourages women to participate in other local content components such as training and procurement opportunities," she added.

Meanwhile, Motal believes that the gender stigma idea is no longer relevant in the labor market. "It is important to not see this as a social stigma. The skill sets now needed for success in many of the sectors of the energy industry are multi-faceted," she added, highlighting that skillful employees should find their place in the industry. "These needed skill sets go beyond traditional engineering, but also include the STEM (science, technology, engineering, mathematics) as well as financial and clearly technology given the operational and financial

aspects. These are not skill sets that are exclusively male-dominated," she explained.

How Can Egypt Catch up?

In Egypt, similar initiatives do not exist. Eman Allam, General Coordinator at the Young Engineers Coalition, believes that the country lacks such initiatives due to issues that add up more pressure to Egyptian engineers.

As an active member at the Engineers Syndicate, she sees that economic problems - such as employment, salaries, and contracts for both men and women - are given priority in the Engineers Syndicate's agenda rather than gender disparity. "In addition, internal political conflicts in the syndicate, which lasted for the past 17 years, have hindered the syndicate from doing its job," she added.

Commenting on her work experience in the energy sector in the Middle East, POWERful Women's Maria Blakley explains she understands that challenges to create similar groups in Egypt might also go beyond the administrative and financial concerns. "I know from my experience in Dubai that ... sometimes 'community' groups can be viewed as potentially dissident, so it is important to be mindful of that, and to state your purpose, aims, and objectives clearly, and to have some terms of reference for public review," Blakley said.

Despite the challenges, Allam believes that the initiative of including women empowerment in the Ministry of Petroleum's modernization program was an outstanding step to confront the address gender disparity in the Egyptian oil and gas sector. "There might be many female engineers who are willing to play an important role in the petroleum industry. If they receive help and support, that will definitely help them," she stressed.



There might be many female engineers who are willing to play an important role in the petroleum industry. If they receive help and support, that will definitely help them.



EMAN ALLAM, GENERAL COORDINATOR AT THE YOUNG ENGINEERS COALITION



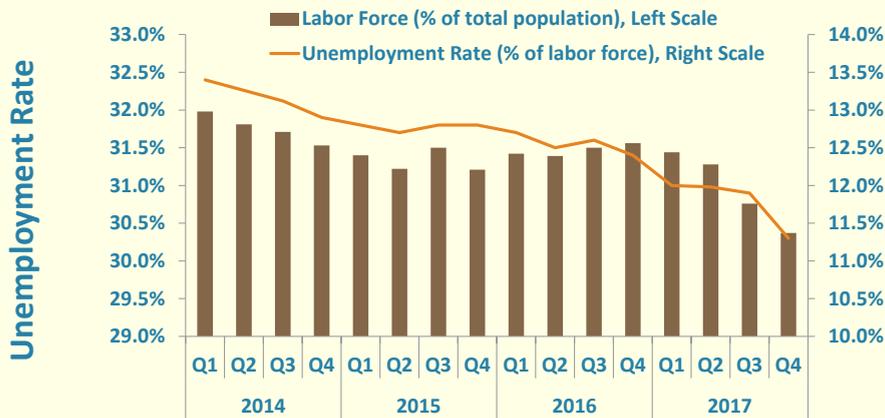
Community' groups can be viewed as potentially dissident [in the Middle East], so it is important to be mindful of that and to state your purpose, aims, and objectives clearly, and to have some terms of reference for public review.



MARIA BLAKLEY, PROJECT MANAGER AT POWERFUL WOMEN



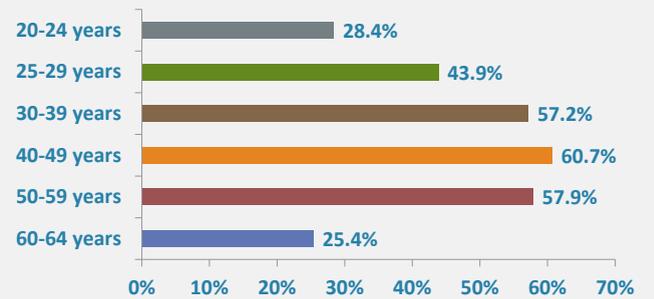
Economic Snapshot: Employment in Egypt



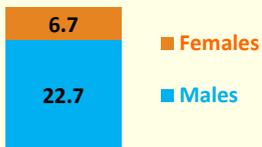
Employment by Gender



Employment by Age Groups



Labor Force (Million)



Male Unemployment Rate



Female Unemployment Rate

Employment by Sector



Agriculture 21.4%



Wholesale & Retail Trade 13.5%



Construction & Building 13.3%



Manufacturing Industries 12.5%



Transportation & Warehousing 8%



Education 7.7%



Public Admin., Defense & Social Security 6%



Others 17.6%

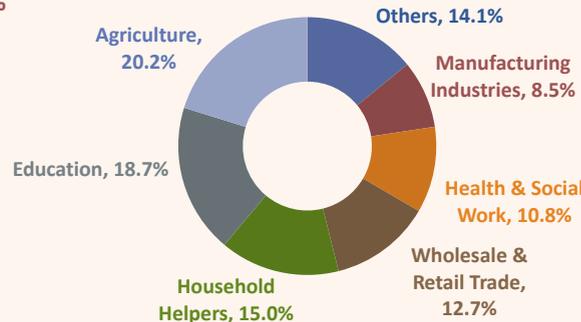
Women Employment in Egypt



Women contribute by 21.1% to employment in Egypt.

67.7% of employed women in Egypt work in the private sector.

Women Employment by Sector



One in every four Egyptian entrepreneurs is a woman.



One in every six Egyptian business owners is a woman.

Source: CAPMAS (Data as of Q3 2017) & AUC's Global Entrepreneurship Monitor (2016).

WDDM-PHASE 9B DEVELOPMENTS

By Mariana Somensi

The West Delta Deep Marine (WDDM) concession is located at the north-western margin of the Nile Delta, approximately 90 km offshore. The concession was awarded to the Contractor Group in the 1993 bid round, having its agreement signed on May 1995. Burullus Gas Company, on behalf of the Partner, has continued with the exploration and development of this concession, from which around 70 wells have been developed until now.

Phase 9b

The scope of the phase 9b project includes drilling eight subsea development wells and tying them in to the existing subsea infrastructure in two campaigns within the WDDM concession area - two wells in Q3 2018, one well in Q1 2019, and 5 wells in Q3/Q4 2019. The project budget accounts for \$741 million.

The eight wells are targeting additional reserves in the fields of Sapphire, Scarab, Simian, Sienna, Swan East, and Silva. Total reserves are estimated at almost 400 billion cubic feet (bcf) and 3 million barrels of oil equivalent (mboe) of condensate, which includes the extension from the existing wells.

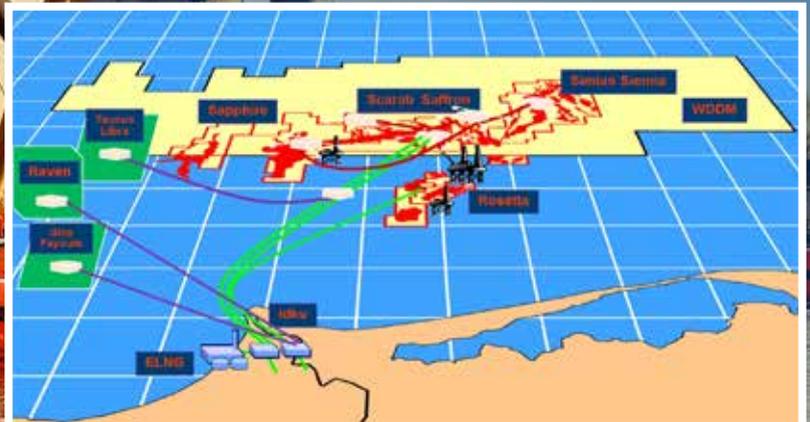
The drilling scope of the project rig includes two exploration wells targeting two Messenian prospects, in addition to deepening the Swan East well in order to reach the third Messenian prospect. The produced gas will be processed at Idku processing facilities, which has enough ullage.

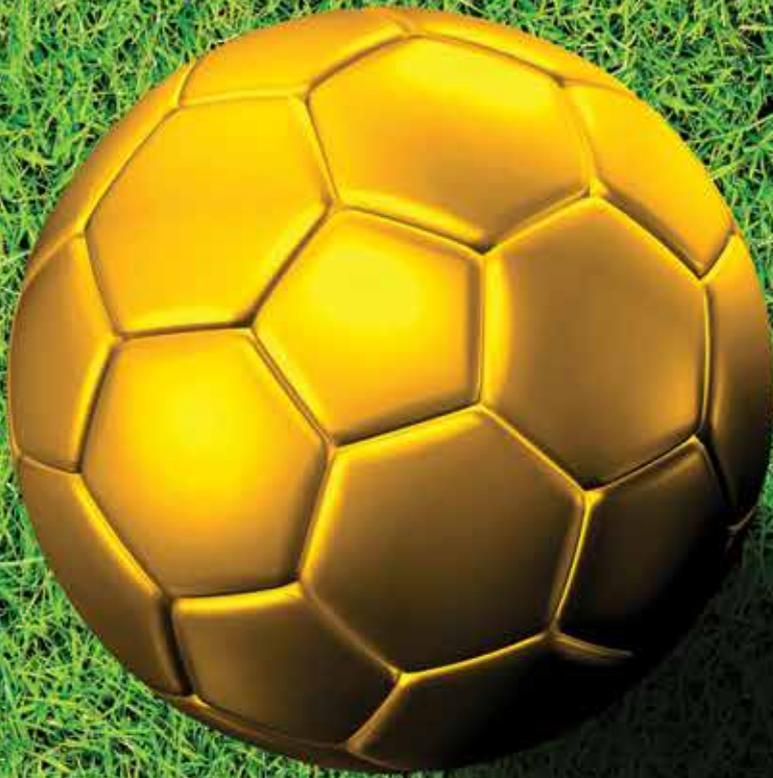
The project had its procurement started on August 2017 with the long lead equipment of three wells. The EPIC scope for the two wells to Saipem has been completed. Work related to fabrication activities is ongoing, while installation window has been confirmed for Q3 2018.

The control system of the 2019 campaign activities was awarded to BHGE (2018 LLI already procured as phase 9a+). Work related to trees and CVC systems to OSS was also awarded; operations are ongoing and the first tree is expected to be delivered before the end of 2018. The EPIC contractor for the 2019 campaign was awarded to SS7.

The drilling campaign started in April 2018 - the NGT1 Rig arrived and started the first spud late April. The rig will start with one of the two exploration wells (Sapphire and South East), subsequently moving to the two 2018 campaign wells.

Wael El-Serag contributed to this article





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EL MOLLA ATTENDS IGU EXECUTIVE COMMITTEE MEETING IN CAIRO

By Mariana Somensi



“The Egyptian oil and gas sector is a top priority as the national strategic engine that drives Egypt’s economic development forward.”

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

The Executive Committee of the International Gas Union (IGU) held its annual meeting in Cairo under the Chairmanship of David Carroll, President of the IGU. The closing meeting took place at the Nile-Ritz Carlton on April 19th, with the honorable presence of the Egyptian Minister of Petroleum and Mineral Resources, H.E. Eng. Tarek El Molla.

The meeting was organized by the Egyptian Gas Association (EGA), which is a member of the IGU, and promoted the developments, changes, and challenges in the international gas market and natural gas’ global supply. It further finalized the arrangements for the World Gas Conference, which will be held in Washington from June 25th to June 29th, 2018.

During the meeting, El Molla delivered a speech in which he noted that, although the need to invest in a new sustainable energy mix and develop more clean energy sources increases, natural gas will continue to play a key role alongside renewable energy in helping to meet the expected increase in energy requirements worldwide.

The minister added that natural gas represents more than 75% of Egypt’s total petroleum reserves, making it the primary source of energy to meet a large part of the domestic demand. He further highlighted that the success of massive gas projects

in Egypt has led the country to expect self-sufficiency in natural gas by the end of 2018.

“The Egyptian oil and gas sector is a top priority as the national strategic engine that drives Egypt’s economic development forward. Accordingly, we developed a clear integrated vision to continue on this success and guarantee a sustainable bright future for Egypt,” he stated.

David Carroll praised El Molla and the Egyptian Minister of Tourism, Rania El Mashat, who welcomed the IGU and expressed their gratitude for the selection of Cairo for the meeting of the IGU Executive Committee.

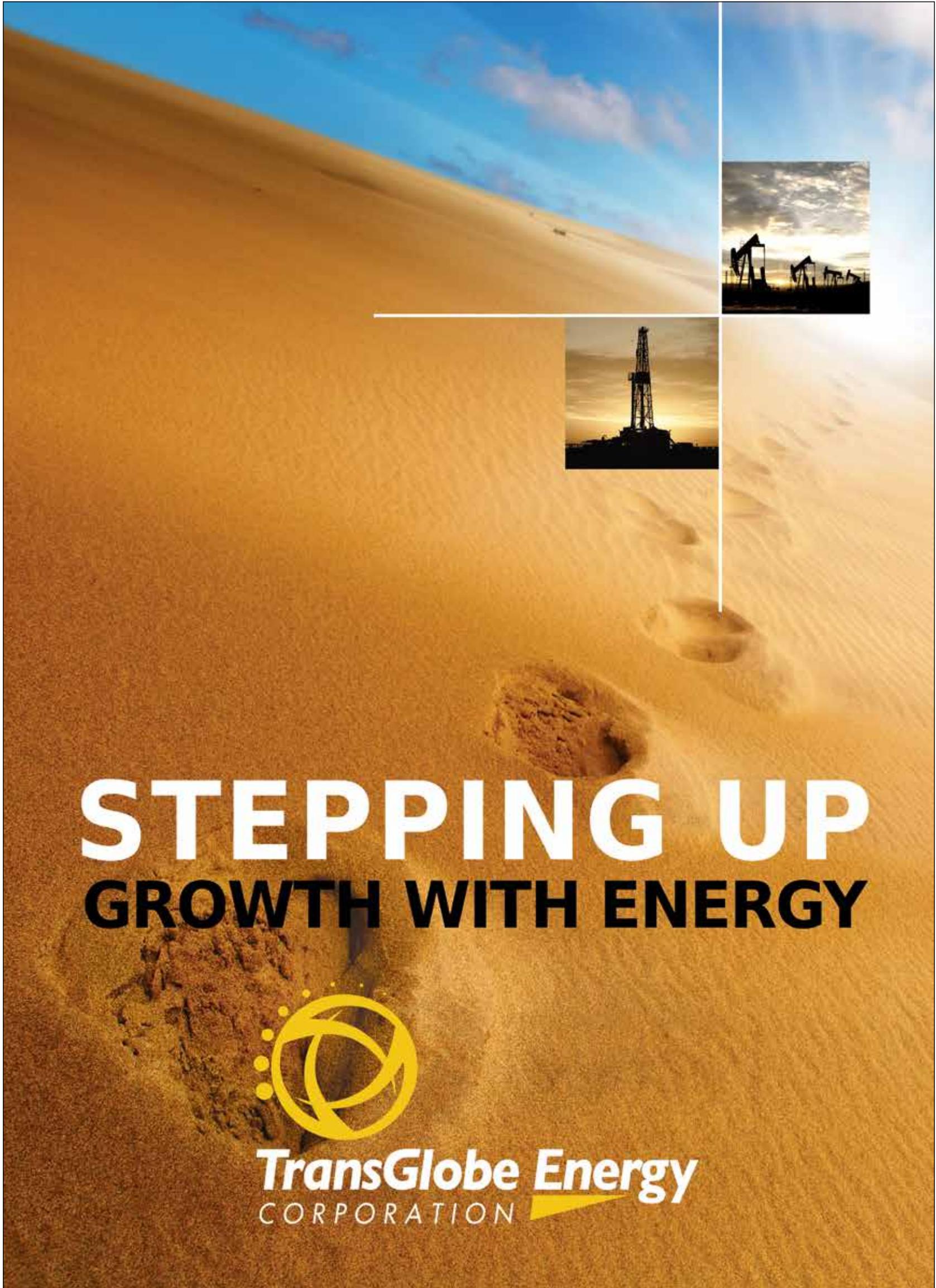
Carroll further praised Egypt’s gas industry for the significant developments that put Egypt on the right path towards a brighter future. He pointed out that the unprecedented success achieved in the Zohr field is a conclusive evidence of Egypt’s ability to successfully execute mega oil and gas projects with high efficiency in a record time.

The development processes in the Eastern Mediterranean represent huge opportunities for



the countries of the region to provide their local economies with the necessary fuel, improve their living standards, and be a catalyst for regional stability, as Carroll stated.

The IGU is a worldwide non-profit organization registered in Vevey, Switzerland. Its secretariat is currently based in Barcelona, Spain. The Union’s mission is to advocate gas as an integral part of a sustainable global energy system and to promote the political, technical, and economic progress of the gas industry. It currently has 90 Charter Members, 12 Premium Associate Members, and 60 Associate Members in 90 countries, covering the complete value of the gas chain.



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EOG TECHNICAL COMMITTEE ADDRESSES PETROLEUM SECTOR'S NEEDS ALONGSIDE EGPC

By Mariana Somensi



EGYPT OIL AND GAS
TECHNICAL COMMITTEE

The Egypt Oil & Gas (EOG) Technical Committee gathered at the Egyptian General Petroleum Corporation's (EGPC) headquarters on April 24th to discuss ways of addressing the challenges and needs of the Egyptian oil and gas sector alongside EGPC.

The discussions that took place during the meeting follow EOG Technical Committee's mission to unify the industry's voice and work in parallel with the government to enhance the well-being of the petroleum industry. The committee is composed by exploration and production companies, service companies, government entities, and leading industry experts, who together find potential solutions for the sector's roadblocks.

Abed Ezz El Regal, Committee Honorable Chairman and EGPC CEO, suggested having a Listening Session to analyze the insights of previous conferences and roundtables promoted by EOG as a road map for improvements supported by EGPC. "The aim of this is to listen to the complains and suggestions of the joint ventures and see what EGPC can do to follow such recommendations or to fix the problems they face," Ezz El Regal pointed out.

The idea was well received by the committee members. "I take it [the Listening Session suggestion] as a unique opportunity for us as a committee to further define our role and demonstrate how we can

bring value to EGPC and the entire local industry," Sami Amin, Committee Member and Managing Director at Subsea 7, commented.

Ezz El Regal further highlighted the importance of having the industry share both successes and obstacles from oil and gas activities. "We always share the successful stories, we never share the challenging ones, which are more important. We will never succeed without looking at the roadblocks. If we share them, we will save a lot," he stated.

Upstream Operational Excellence Convention

Building on the achievements of the first edition of Upstream Technical Convention, the EOG Technical Committee further discussed the agenda and the format of the 2nd Upstream Operational Excellence Convention, which will be held in Cairo in November 2018.

"This year our plan is the same as what we have done on the other edition, but we will add two more aspects to it: We will have one day specialized for young professionals and people development. We would also like to include an Operation Excellence Award Gala Dinner for joint venture companies, mainly," Mohamed Fouad, EOG Technical Committee Co-Chairman, stated.

The 2nd Upstream Operational Excellence Convention targets increasing awareness and finding solutions to meet the expectations of the

Ministry of Petroleum's Upstream Performance pillar.

Field Workshop

During the meeting, the committee additionally addressed the EOG inaugural workshop for operations best practices, which is proposed to be held in September at the Qarun field. "What we have seen is that we usually include office-based engineers and experts in our conventions, but this time we need to include people in the field ... to participate in discussing the best practices in the field to reduce cost and increase efficiency and safety," Mahmoud Shawkat, Committee Member and Director Sales & Marketing – Egypt, Sudan & South Sudan – at BHGE, noted.

"We have selected Qarun [as the field where the workshop will take place] and we will invite all the surrounding companies in the Western Desert to participate. In the workshop, we will ask every company to give examples of two cases of fields that have improved in their performance," he added.

The field workshop will include discussions on optimization, well uptime, technical improvements, water handling, chemical usage, operational issues, and other technical aspects of field engineering. The unique papers submitted for the field workshop will be developed into ideas to be presented during the 2nd Upstream Operational Excellence Convention in November.



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SUPPORTING A GENERATION OF EGYPTIAN SUBSEA ENGINEERS

As the Egyptian subsea oil and gas industry continues to develop and expand with new mega deep-water subsea development projects in the Mediterranean Sea, the need for new engineers and technicians entering the subsea sector arises, as well as the need for the development of graduates to become the next generation of engineers that will help the Egyptian subsea sector achieve its global potential.

The subsea sector is one of the most dynamic and exciting areas of the global oil and gas industry, which is an adversely, increasingly complex and harsh environment. In deep-water operations, harsh temperature, pressure, and corrosion test the efficiency of design and produced equipment and tools. Most subsea engineering operations depend on automation and remote operations to implement and repair remote subsea systems deep under the water.

Subsea engineers design, produce, and maintain equipment and tools used in subsea oil and gas production. There is a continue growing skill gap in the subsea industry locally due to the increasingly need of new developments, lack of local formal training and skills need in subsea, in addition to experienced skills migration primarily to Europe.

Currently, subsea learning and development are often sourced from abroad, primary through technical training courses, online education programs, attending an academic diploma or master's degree in subsea engineering. All these means, however, are only available to a limited percentage of the industry development needs. Cost permit, some companies will put its graduate engineers through a complete development scheme in subsea engineering. It is important that local industry and educational institutes work together to develop programs and means to support and encourage next generation of engineers from a local perspective. Additionally, as a global sector, it should also share useful insights into the latest subsea engineering and technology, covering competencies as knowledge and understanding, application to practice, management, interpersonal skills and overall of how subsea jigsaw fits together.

Ahmed Mahran

Subsea Development & Integrity Management Professional

BOREHOLE IMAGES IN THE PETROLEUM INDUSTRY

Borehole images are electronic pictures of the rocks and fluids encountered by a wellbore. Such images are made by electrical, acoustic, or video devices which have been lowered into the well. Images are oriented, they have high vertical and lateral resolution, and they provide critical information about bedding dip, fractures, faults, unconformities, paleocurrent directions, vuggy and fracture porosity, and other geological features.

Case studies have shown that borehole images are best used in conjunction with other available wellbore data, such as other logs, cuttings, cores, and production data. Because of the high expense and risk, relatively few wells are now being cored. Cores taken are generally short, so they may miss all or part of the target formation. In exploration wells, the depth to the target formation may even be unknown. Some lithology tend to have poor core recovery, such as unconsolidated sands, and fractured, vuggy, or brecciated intervals. In some cores, the electrical or acoustic contrast between different lithology may be more significant than the contrast apparent to the human eye. In recent years, all of these factors have led to the increased use of borehole images to characterize subsurface sedimentary rocks. This chapter provides a guide to the acquisition, processing, and interpretation of borehole images.

Dr. Ahmed Abd El-Gawad Sultan

THE CHALLENGES OF EXPLOITING SHALE GAS IN EGYPT

Egypt is required to provide energy to the local market on one hand, and is obliged to diversify its energy sources to overcome global economic crises on the other. Shale gas in the Western Desert could provide one opportunity for energy diversification.

Although shale gas is not chemically different from conventional natural gas, experts must provide a scientific vision for its exploitation given that it is located in the source rock at a depth of more than 1000 meters. This gas is also located in very tight pores, requiring it to be fractured in order for it to flow to the producing wells.

However, the extraction of shale gas has raised fears among experts that it could threaten public health and pollute both Egypt's groundwater reserves and the desert environment. Existing geological maps show, however, that shale gas bearing zones are deeper than 1000 meters, while groundwater is not usually deeper than 300 meters, reducing the risk of contamination. Nonetheless, it remains possible that hazardous chemicals may pollute desert groundwater, and that carcinogenic gases are released.

It is necessary for energy experts to discuss how to extract this gas. Many experts have expressed concern about the significant amount of water required for the extraction process. A million cubic meters of desalinated water are consumed per billion cubic meters of shale gas, requiring the government to allocate large-scale extraction projects to dig water wells and treat wastewater.

Despite the results achieved by the US shale industry, it is unlikely that production technology will be transferred to Egypt any time soon. Although there are large proven reserves in Egypt, technical problems - such as the depth of rock deposits, their proximity to urban areas, and the lack of technical skills - make their exploitation difficult in the short term. Egypt must find a way to benefit from US experience in the exploration and production (E&P) of shale, and attract the expertise of companies familiar with the shale extraction process. For this, Egypt must open up to US companies if it is going to exploit its shale reserves.

Recommendations

1. The first step in any forward-looking and energy-oriented approach lies in the rational use of energy sources, including the search for alternative sources such as shale gas.
2. Egypt must start E&P using the latest technologies and methods used in the US, which would be more economically and environmentally efficient.
3. The government should increase investment into shale R&D, taking the latest technologies used by US companies into account.
4. Efforts should be made to facilitate the transfer of information, and develop local and international partnerships.
5. Scientific exchange and consultation between Egypt and the US should be encouraged. This can be achieved through holding seminars and periodic meetings, and updating studies in the field of Egypt shale gas.

HASSAN SALEM

EGPC Reservoir Engineering General Manager



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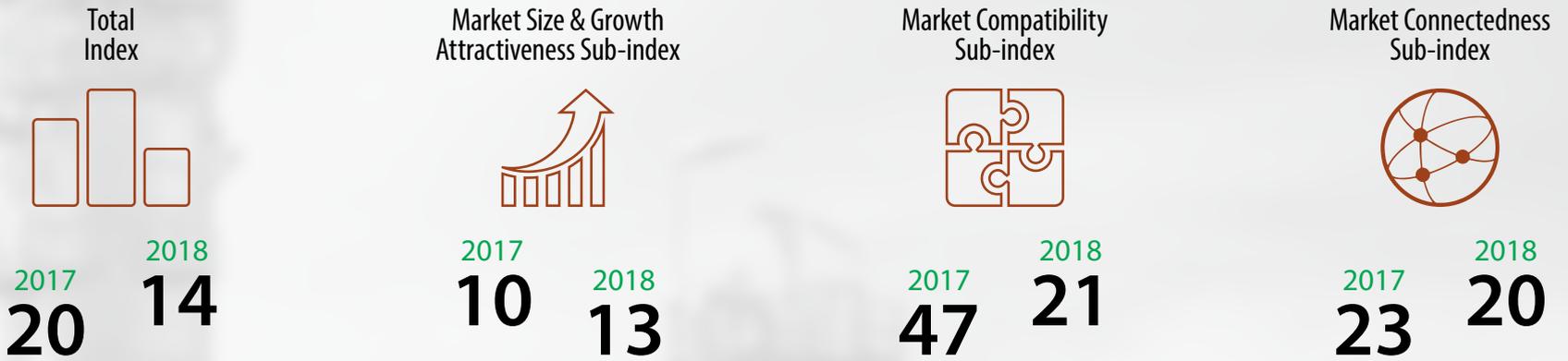
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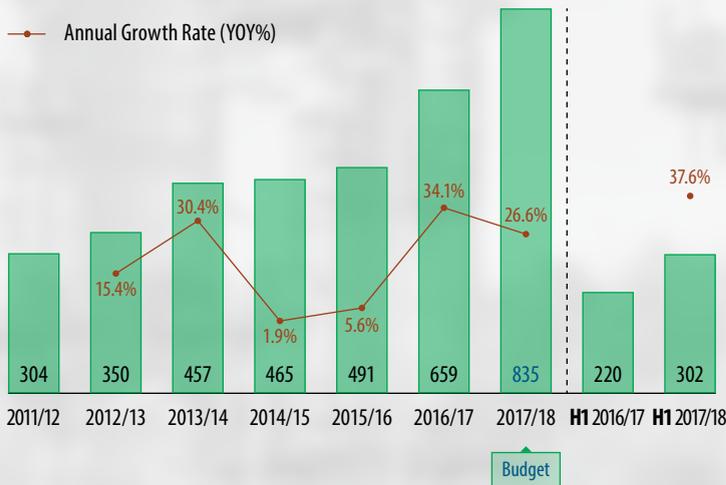
Egypt's Rank in Agility Emerging Markets Logistics Index 2018



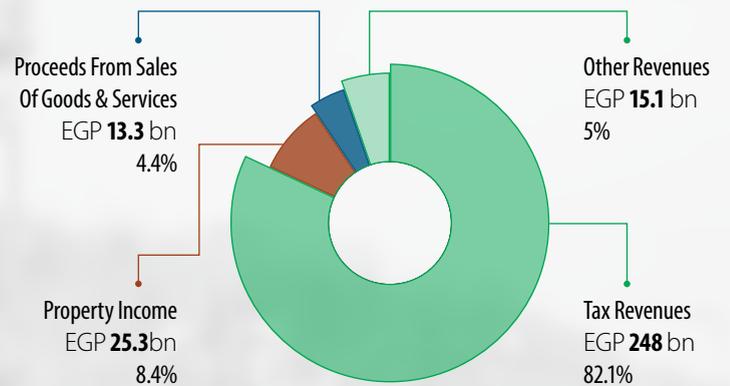
Agility Emerging Markets Logistics Index: An annual snapshot of industry sentiment and a ranking of the world's 50 leading emerging markets by size, business conditions, infrastructure, and transport connections. (lower values indicate higher ranks)

Egypt's Financial Indicators

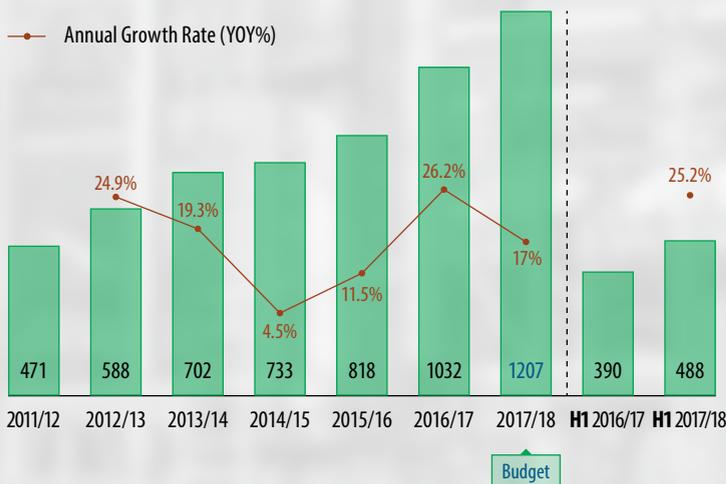
Total Revenues (EGP bn)



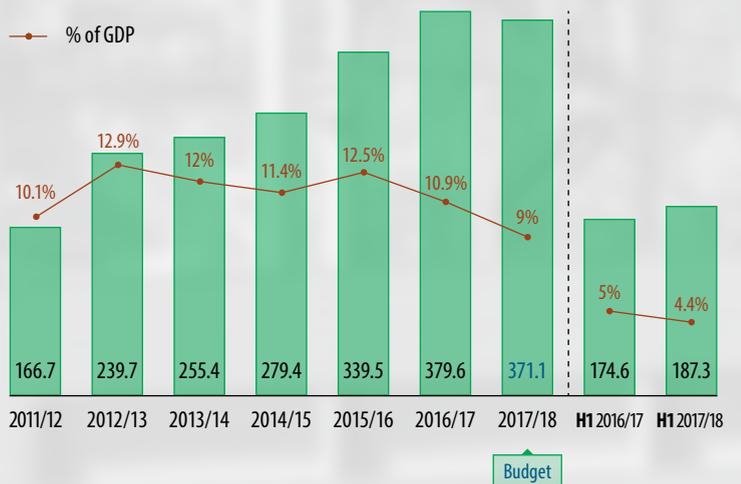
Distribution of Total Revenues (H1 2017/18)



Total Expenditures (EGP bn)



Budget Deficit (EGP bn)



RESEARCH BY HAGER MAGDY

Annual growth rate (ratio of change between 2 years)

Source of raw data: Central Bank of Egypt, Transport Intelligence, Ministry Of Finance, and CAPMAS



"I'm proud of all what we have achieved, not only in MOC, but through the last couple of years. Securing our market position amongst the powerful international companies is something that motivates us to work harder for a better future."

Islam Kortam, Vice Chairman and Shareholder of Sahara Integrated-SI.



"It was an honor to receive this positive feedback from all visitors. We finished the event by receiving an award from the exhibition for "Best Exhibitor" along with the multinational companies Schlumberger, Halliburton, Edison and IPR.

On behalf of our management , I would like to thank all the team, Mohamed Gomaa - Al Tahrir CCO, Corporate Communication team, and all companies' Sales & Marketing teams for their great efforts to achieve such success."

CEO of SAHARA Integrated - SI, and Sahara Petroleum Services - SAPESCO, Eng. Said Riad congratulating the teams for their efforts during MOC 2018.



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RIGS PER SPECIFICATION

Date	Land-Drilling	Land Workover	Jack-Up	Semi Submersible	Fixed Platform	Standby/Stacking	Drillship	Total
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-18	46	46	11	1	0	43	2	149
Feb-18	46	48	11	1	1	0	2	109
Mar-18	46	48	11	1	1	40	2	149

RIGS PER AREA

Month	G.O.S.	Med. Sea	W.D.	Sinai	E.D.	Delta	Total
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-18	10	4	68	13	8	3	106
Feb-18	11	4	69	14	8	3	109
Mar-18	11	4	69	14	8	3	109

PRODUCTION MARCH 2018

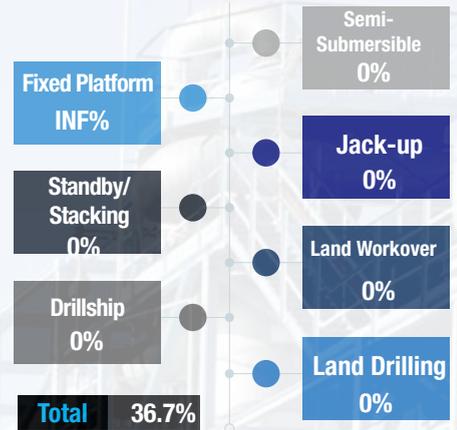
	Crude Oil	Equivalent Gas	Sold Gas	Condensate	Unit: Barrel
Mediterranean Sea	18,723	14,536,197	81,402	921,627	
Eastern Desert	1,986,123	0	0	0	
Western Desert	9,990,125	6,332,665	35,463	1,157,163	
Gulf of Suez	4,178,921	600,486	3,363	76,540	
Delta	18,542	7,295,315	40,854	447,833	
Sinai	1,723,514	429	2	15,480	
Upper Egypt	7,129	0	0	0	
Total	17,923,077	28,765,092	161,084	2,618,643	

*Natural Gas figures are in Boe.

*Crude total excludes Upper Egypt production

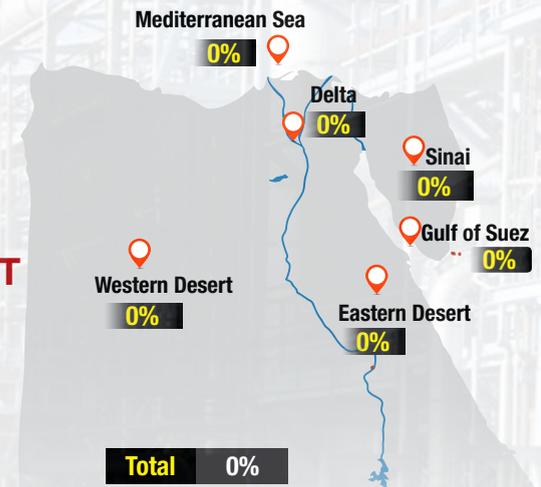
M.O.M CHANGE IN RIG COUNT PER SPECIFICATION

MoM calculations are for Jan & Feb figures.

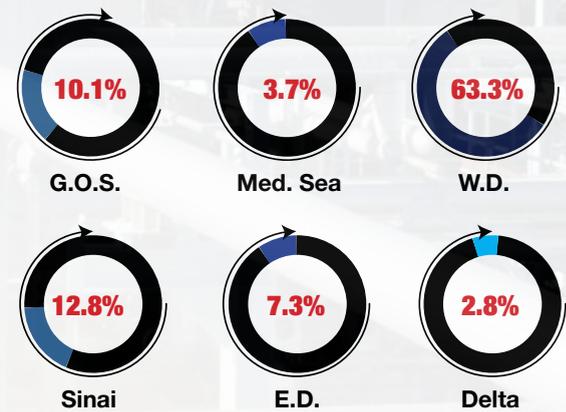


M.O.M CHANGE IN RIG COUNT PER AREA

MoM calculations are for Jan & Feb figures.



DISTRIBUTION OF RIGS MARCH 2018



DRILLING UPDATES

Region	Company	Well	Well Type	Rig	Depth	Well Investments
Western Desert	SHELL	NUMB-A	EXP	EDC-48	14140	3.400 M\$
	NORPETCO	ABRAR S-9	Development	ECDC-2	6920	1.300 M\$
	PETROSILAH	N.SILAH 3-1	Development	ECDC-1	7777	1.220 M\$
	THARWA	EAS C-1X	EXP	TANMIA-1	7950	1 M\$
SINAI	MEDITERRA	TEL-1	EXP	SHAMS-1	4540	500,302 \$
	PETROBEL	113-A-75	Development	ST-3	6298	1.850 M\$
	PETROBEL	BLS-23 ST-1	Development	ST-1	10784	4.370 M\$
	PETROBEL	112-60 ST-1	Development	ST-3	8753	3.150 M\$
Gulf Of Suez	GPC	HH 83-1D	Development	ADMIRIN-3	6430	4,500 \$
	GPC	NAO-3/5C	Development	ADMIRIN-6	6652	4,200 \$

*DRILLING are for March 2018.

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