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Pipeline
OIL & GAS NEWS

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EGYPT OIL AND GAS SECTOR GROWS LEAPS AND BOUNDS

Eng. Tarek El Molla, Minister of Petroleum and Mineral Resources, discusses the latest developments in Egypt's oil and gas sector and why 2019 was such a strong year for growth in the energy sector

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Editor-in-Chief's Welcome

Welcome to our EGYPS focused issue.

Once again our February issue is a special Egypt focused edition that not only has a dedicated EGYPS 2020 Focus but for the first time we have put together a new Egypt Oil and Gas report.

The cover interview for this special EGYPS issue is an in-depth Q&A with Egypt's Minister of Petroleum Eng. Tarek el Molla, who gives an extensive look at why 2019 was such an important year for the country's energy sector and how 2020 looks even more promising with new concessions and a real focus on the downstream sector. It is clear that Egypt's oil and gas sector is going from strength to strength and this is a great opening gambit to EGYPS 2020.

The new Egypt Oil and Gas report gives a real insight into the current state of Egypt's Upstream, Midstream and Downstream sectors. We hope that this can be used as a starting point for anyone wanting to know the state of Egypt's oil and gas sector. We also have an exclusive opening interview in the report from Dragon Oil's CEO who talks about the UAE based company's big ambitions in Egypt. The report also has exclusive data on Egypt from Kpler that nicely highlights the key figures from some of the main energy indicators in the country. Finally, the report contains a special legal perspective on the country's latest laws that are applicable to upstream investments.

The other big part of this special EGYPS edition is our dedicated EGYPS 2020 Focus which has exclusive interviews with CEOs from the likes of Air Products and Energean who will be speaking at the event. We also hear from Wintershall Dea talking about the new focus on Egypt since the merger of the two German companies last spring. The head of Siemens Oil & Gas for MENA wrote an exclusive op-ed talking about the technology opportunities that Siemens sees within Egypt. Finally the EGYPS focused section also has news from exhibitors talking about what technologies they will be showing over the three days of EGYPS.

We will be at EGYPS so if you want to meet, please drop us a line.

Julian Walker
Editor-in-Chief

Oil gives back January gains as Chinese virus spreads

By: Nadia Saleem, Editor, Pipeline Oil and Gas News

Oil prices fell over 10 per cent during January following fears a spreading virus from China would impact demand from the world's largest manufacturer and major consumer of crude oil.

Brent crude fell below $60 per barrel, from the month's starting price of $67.92 per barrel.

The Chinese government halted public transport to and from Wuhan - the province where the epidemic is suspected to have originated. The shutdown has angered residents as it comes at the time of the biggest holiday season for the country – the Chinese New Year.

Additionally, tensions over a U.S. and China trade dispute also dissipated after the two countries signed a 'phase one' agreement that will remove some tariffs from Chinese goods being exported to U.S.

Although yet to be finalised, with many sceptical the trade war will be resolved anytime soon, the initial agreement has helped support prices.

Meanwhile, global supply of oil from Libya took a hit in January after a military blockade led to oilfields being shut down and exports halted.

The National Oil Corporation (NOC), Libya's state energy firm said the Libyan National Army has instructed its subsidiaries to halt exports from Brega, Ras Lanuf, Hariga, Zueitina and Sidra ports.

The embargo means daily production of 800,000 barrels per day, worth US$55 million a day will be affected, NOC said.

The latest blockade follows a long-running conflict in Libya, where two rival factions have claimed the right to rule the country for more than five years.

Just before the blockade, NOC said two big oilfields in the southwest had begun shutting down after forces loyal to the Libyan National Army closed a pipeline.

Also, Middle East hot spots of Iran and Iraq that roiled oil markets in early January, continue to see protests in events that have enfolded following a U.S. attack in Iraq

that killed Iranian Major General Qassem Soleimani, leader of the elite Quds force and one of Iran's most influential figures.

In Iraq, protestors are demanding U.S. troops to leave the country, where some 5,000 American troops remain even after Iraqi Parliament voted to expel foreign forces following the killing of Soleimani.

In Iran however, civilians are protesting against the government after accidental missiles shot down a Ukrainian Airlines plane that took off from Tehran everyone on board has died including many Canadians, Iranians and Ukrainians.

The Iranian government, which belatedly took responsibility for shooting down the plane in retaliatory attacks on a U.S. base in Iraq, continues to hold the black box of the crashed plane despite earlier announcing plans to send it to Ukraine.

Separately, OPEC+, a group made of OPEC members and Russia-led allies who are acting to eradicate oil stockpiles by cutting production and maintain prices above the $60 per barrel mark, are due to meet in Vienna in early March to review their policy.

The group in December agreed to deepen production cuts to 2.1 million barrels per day until the end of March to bring a market balance.

As the group cuts production, OPEC in its latest report said it expects less demand for its oil during 2020. It revised down by 0.1 million barrels per day (bpd) demand for its oil compared to last month's forecast to stand at 29.5 million bpd. This is around 1.2 million bpd lower than the 2019 level, OPEC said.

This follows a dip in OPEC's 2019 crude demand amid a struggling global economy – a picture OPEC sees improving in 2020.

For 2020, OPEC revised oil demand growth up by 0.14 million bpd from the previous month's assessment to forecast it at 1.22 million bpd, mainly reflecting an improved economic outlook for 2020.

Meanwhile, it raised its forecast for non-OPEC oil supply growth in 2020 by 0.18 million bpd to 2.35 million bpd, up from 1.86 million bpd in 2019.

EGYPT OIL AND GAS SECTOR GROWS LEAPS AND BOUNDS

Eng. Tarek El Molla, Minister of Petroleum and Mineral Resources, discusses the latest developments in Egypt's oil and gas sector and why 2019 was such a strong year for growth in the energy sector

Pipeline _____ What were the most important developments for Egypt's oil and gas industry in the last 12 months?

In 2019, the oil and gas industry witnessed great leaps in its whole value chain from upstream to downstream, along with the services provided to citizens through availing the petroleum products and the national programme to convey natural gas to residential units.

The petroleum sector succeeded in achieving outstanding outcomes, on top of which are; realising unprecedented natural gas production reaching 7.2 BCFD (billion cubic feet per day), achieving gas production self-sufficiency and resuming exports. In addition, crude oil production reached 630,000 barrels per day, contributing to achieve the highest record of petroleum wealth in August 2019, e.g. about 1.9 million barrels of oil equivalent, condensates and natural gas per day.

The sector also succeeded in reducing the IOC's accumulative arrears in the past years to reach $900 million by June 2019 that is considered the lowest rate since 2010, which confirms the present credibility and commitment of the Egyptian Government, particularly with the expansion in developing natural gas. Last year, investments exceeded $10 billion, when Zohr gas field project reached its optimum production rate and the second phase of West Delta and North Alexandria projects started production.

We signed eight oil and gas exploration agreements, with total investments of $179 million, in addition to 17 new on-going agreements that were approved by the parliament with total investments exceeding $1 billion. The EGPC and EGAS bid rounds announced their results last February; offering 11 blocks with total signing bonuses of about $104.5 million, and total investments of $744.5 million, to drill 50 wells. In March 2019, Ganope also offered an international bid round for oil and gas exploration in 10 blocks at the Red sea area and the IOC's offers are, currently, being evaluated.

The Egyptian Refining Company's (ERC) project in Mostorod is considered the largest and most recent refining project that contributes to securing part of the petroleum products locally. Meanwhile, transporting natural gas to residential units, witnessed unprecedented boom represented in the continuous doubling of rates to reach one million and 250,000 residential units annually at a rate of 100,000 units per month, which led to an increase in the number of housing units that were connected with gas to exceed 10.6 million.

The 2019 Egypt Petroleum Show opening ceremony

New International Bid Rounds in 2020 to explore for oil and gas in the Western Desert, Gulf of Suez and East Mediterranean

The number of vehicles converted to being fueled by natural gas increased in 2019, to exceed 43,000 vehicles bringing the total number of converted vehicles since the startup of activity in 1996 to 300,000 vehicles.

Pipeline _____ What new partnerships are underway to develop resources and support the country's growth aspirations?

It is well known that tangible success cannot be achieved apart from successful partnerships that benefit all parties. Our IOC partners, operating in Egypt, play a significant role that cannot be denied in contributing to the success stories achieved during the past years. We have already held new partnerships recently, with major international companies working in Egypt for the first time, in the upstream domains such as American companies, Exxon Mobil and Chevron. Moreover, we've expanded our partnership with Shell International, as it was awarded five new blocks in 2019, to invest in the upstream field.

The East Mediterranean Gas Forum is also a distinguished partnership at the level of the countries in the region, bringing together Egypt and six Mediterranean countries with the goal of cooperation in monetising gas discoveries and distinctive infrastructure, for the benefit of the countries and their people.

Egypt also launched strategic partnerships in the domain of energy, with both the United States and the European Union, contributing to Egypt's benefit from the support, potentials and expertise of both parties to contribute to transforming Egypt into a regional energy hub.

Pipeline _____ How has Egypt's energy sector become a more attractive destination for foreign investment?

With regard to foreign investments, we have to consider what our partners say about their investment success stories in the Egyptian oil and gas sector at conferences in Egypt and abroad. They praise the Egyptian model in oil and gas industry development and how Egypt created an attractive climate for investment and success, which resulted in achieving distinctive business outcomes, so that everyone agrees that the current period is the most convenient, for directing their investment to Egypt, in the field of oil and gas industry. Moreover, the State has taken into account the reforms and incentives that were taken to achieve balance and benefit the State as well as the investor. In addition, it has provided a unique experience, concerning its obligations to pay the previous years' arrears, along with fulfilling its new commitments, as the Egyptian oil and gas industry has witnessed positive changes recently that led the sector to become one of the most significant investment destinations for the major oil companies.

Actually, the indicators are quite clear, as Egypt has awarded 28 new blocks for oil and gas exploration to international companies through six bid rounds over the past five years, and has signed 103 agreements with international companies for oil and gas exploration and development, since November 2013, with total minimum investments of about $17 billion and signing bonuses of $1.2 billion, for the drilling of 431 wells. In fact, these results are strong indications of the success of reform plans, particularly with the entry of new major companies in upstream domain in Egypt for the first time, which is an attracting factor for other companies to invest in Egypt. This contributes to increasing the flow of investments, in addition to the fact that the companies currently operating in Egypt are expanding their investments and

activities in the upstream domain.

Furthermore, it is planned to continue signing the 17 new upstream agreements, approved by the Parliament last year.

Additionally, we shall offer new international bid rounds in 2020 to explore for oil and gas in the Western Desert, Gulf of Suez and East Mediterranean and the frontier areas in particular, within the forthcoming period.

Undoubtedly, the demarcation of the maritime borders with the Kingdom of Saudi Arabia, has allowed Egypt to launch its first International bid for oil and gas exploration in the untapped area of Red Sea, which represents promising opportunities for IOCs to pump new investments in that region.

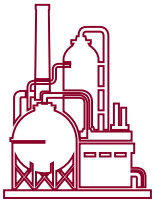
As one of the main axes in our plans, we will work on intensifying our activities in the existing crude oil production areas to offset the natural decrease in production and achieve new discoveries to put them on production as soon as possible.

Pipeline _____ How are the plans for establishing Egypt as a regional energy hub going?

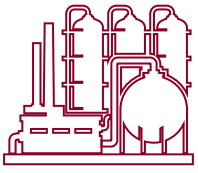
The Egyptian State has a specific vision and goal represented in the project of transforming Egypt into a regional hub for oil and gas trade, which will have a very significant return on Egypt and its national economy. The project will help Egypt restore its pioneering role in the region and monetise the natural gas infrastructure, attract more investments and secure energy resources to meet the country's requirements, provide job opportunities, as well as foreign currency.

For its part, the Ministry of Petroleum embarked on a work program within the Modernisation Project to develop the sector to work according to specific strategies. The programme includes 3 major axes, in which the Ministry moving forward; whether at the internal, the political, or at the technical and commercial levels. These axes include the implementation of new infrastructure projects and achieving the optimal exploitation of the existing infrastructure together with the issuance of legislations that support investment in oil and gas domain, where a law was issued to regulate gas market activities and the establishment of an independent gas regulatory which gives an opportunity for the private sector to enter and compete in the whole chain of gas industry. Furthermore, Egypt has all the qualifications to play this role, in light of its excellent strategic location, having the necessary infrastructure and facilities, e.g. power generating stations, gas liquefaction plants, re-gasification unit, refineries, storage tanks & warehouses, port docks along with oil and gas pipelines networks.

In fact, Egypt has been keen to take active steps to establish a wide board regional cooperation with gas producing countries in the Eastern Mediterranean region and establish a partnership with the European Union in the field of energy to serve the Egyptian perspective to transform into a regional energy Hub. Egypt has the keys to the future of gas in the Eastern Mediterranean and seeks to monetise all the current potentials in that region. In addition, we take into consideration the ambitions of the countries of the Eastern Mediterranean region to achieve the maximum benefit of the discovered natural gas resources and the future ones. Therefore, we worked on establishing the first forum that gathered gas producing countries in this region, under a joint Egyptian initiative within the framework of a cooperation mechanism with both Cyprus and Greece during the Crete Summit, that took place last October. President Sisi agreed with the leaders of Cyprus and Greece on the idea of establishing the forum. To realise this agreement on the ground, Egypt initiated an invitation to the energy ministers of the Eastern Mediterranean countries and representatives of the European Union and the U.S. Energy Minister for two meetings to activate the initiative to establish the forum



Petrochemicals:
4 new projects, with investments of $2 billion



Refining:
6 new projects, in Alexandria, Suez and Assiut, with investments of $ 7.1 billion

along with the coordination to invest in gas discoveries and infrastructure in the eastern Mediterranean for the benefit of countries and their peoples.

Pipeline _____ How important is Egypt's burgeoning downstream sector?

The current expansion in refining and petrochemicals domain represent a new added value to Egypt from its petroleum resources and assets. We have a work programme, currently being implemented in the refining industry to achieve self-sufficiency of fuel by the fiscal year 2022/2023, through the Egyptian refineries' throughput. The programme includes six new projects, currently being implemented in Alexandria, Suez and Assiut, with investments of about $7.1 billion, aimed at increasing domestic production of petroleum products with high economic value, such as gasoline, gas oil, and LPG, as well as providing petroleum products with the highest quality standards, in accordance with the international standards. It is planned to implement these projects successively; including producing high-octane gasoline project in Assiut, Midor refinery expansions project in Alexandria, ANOPC complex project for gasoline, gas oil and LPG production in Assiut, which is considered the largest refining project in Upper Egypt. These are in addition to the Red Sea Refining and Petrochemicals Complex in Suez, as well as the LPG and asphalt production units in Suez. Besides these projects, we have completed this year the largest project in the refining domain, which is the Egyptian refining project in Mostorod, with investments of about $4.3 billion, applying the latest advanced technologies. It is considered a successful partnership between the government and the private sector. This project is currently operating experimentally, paving the way for regular operation. Moreover, we are planning to establish a huge complex for refining and petrochemicals in the new El Alamein region, with investments of about $8.5 billion.

In the petrochemicals domain, we are implementing four new projects, with investments of about $2 billion to add new production capacities to this industry, as well as increasing and diversifying the products provided. We have the project of Formaldehyde Production of Suez Company for Methanol Derivatives, in Damietta Port, poly butadiene production project in Ethydco Complex in Alexandria and Sidpec Expansions Project in Alexandria for Propylene and Polypropylene Production, as well as Medium-Density Fiberboard (MDF) Production Project.

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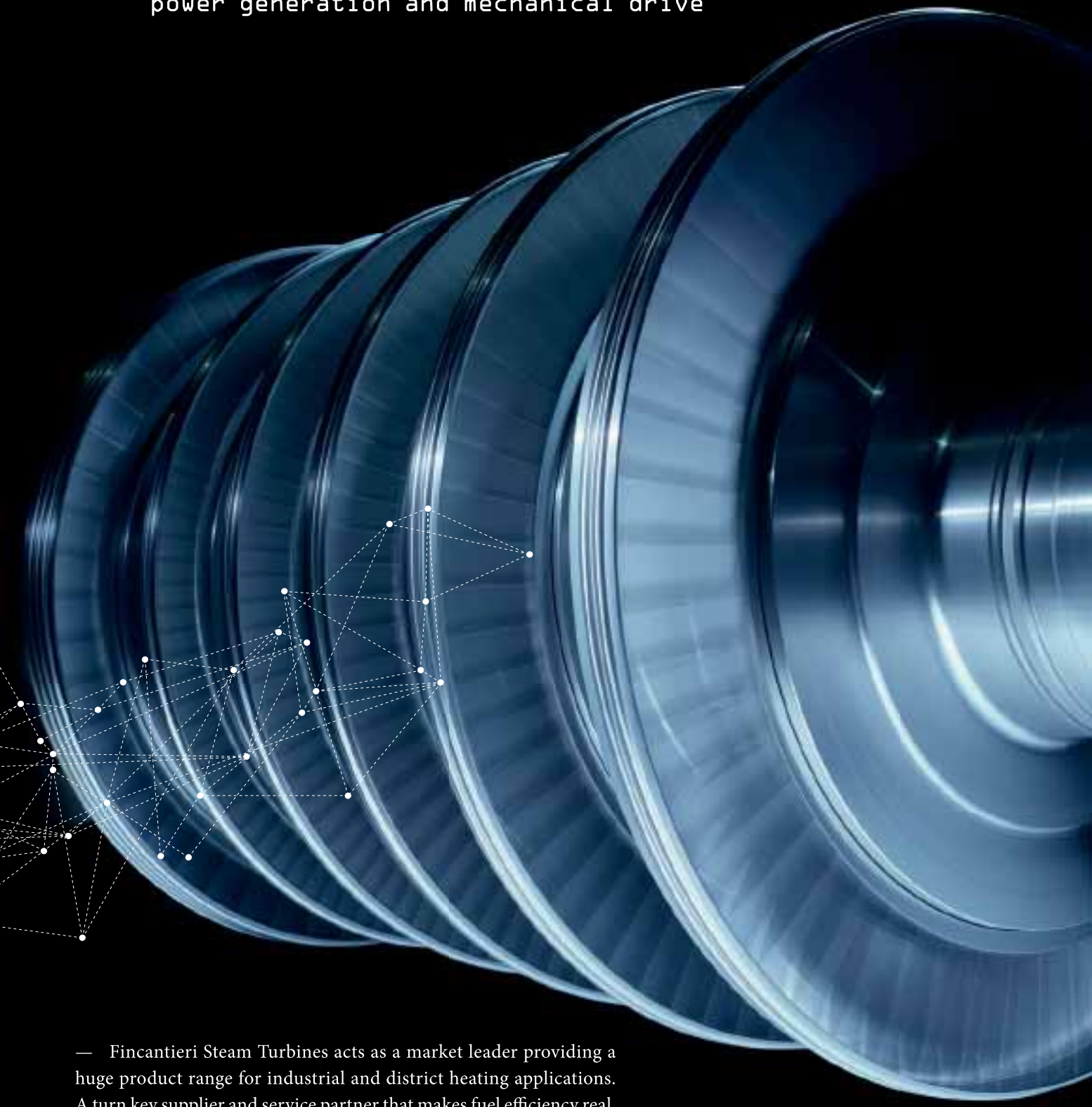

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ADNOC, Eni to explore CCUS opportunities

Abu Dhabi National Oil Company (ADNOC) signed a strategic framework agreement with Italy's energy company, Eni, to explore new opportunities for collaboration in carbon capture utilisation and storage (CCUS).

Under the terms of the agreement, ADNOC and Eni will jointly explore opportunities for collaboration in relation to innovative geomechanical and geochemical workflows for CCUS programs as well as in advanced analysis and modeling of thermally induced fractures in oil and gas reservoirs.

Geomechanics refers to the study of how subsurface rocks deform or fail in response to changes in stress, pressure, and temperature, while geochemistry relates to the study of the chemical composition of the earth's crust. Both geomechanics and geochemistry relate to the development of CCUS programs.

The two entities will also look at additional strategic opportunities in research and development (R&D) across the oil and gas value chain.

It agreement builds on ADNOC's recently announced sustainability goals, particularly its commitment to decrease its greenhouse gas (GHG) intensity by 25 per cent by 2030, enabled by its industry-leading CCUS program.

The framework agreement was signed by His Excellency Dr. Sultan Ahmed Al Jaber, UAE Minister of State and ADNOC Group CEO and Claudio Descalzi, CEO of Eni.

OPEC sees lower 2020 demand for its oil

OPEC forecast lower demand for its crude in 2020, even as global demand is seen climbing upwards after a U.S.-China trade deal.

The Organization of Petroleum Exporting Countries (OPEC) said demand for its crude was revised down by 0.1 million barrels per day (bpd) from last month's forecast to stand at 29.5 million bpd. This is around 1.2 million bpd lower than the 2019 level, OPEC said in its latest Monthly Oil Market Report.

This follows a dip in OPEC's 2019 crude demand amid a struggling global economy – a picture OPEC sees improving in 2020.

Meanwhile, it raised its forecast for non-OPEC oil supply growth in 2020 by 0.18 million bpd to 2.35 million bpd, up from 1.86 million bpd in 2019.

For 2020, OPEC revised oil demand growth up by 0.14 million bpd from the previous month's assessment to forecast it at 1.22 million bpd, mainly reflecting an improved economic outlook for 2020.

"Improvements in global trade relations and monetary policies remaining accommodative, the 2020 GDP growth forecast was lifted slightly by 0.1 pp to 3.1 per cent," the group said in the report.

As a result, total world oil demand is projected to rise from 99.77 million bpd in 2019 to 100.98 million bpd in 2020, OPEC said.

However, it said it expects some headwinds as further developments are on the horizon in U.S.-China trade and Brexit, fiscal imbalances in some key economies.

Kuwait sees Neutral Zone output to reach 0.25 mln bpd by yr-end

Kuwait expects production from the Neutral Zone, shared with Saudi Arabia, to reach 250,000 barrels per day (bpd) before the year end, the country's energy minister said.

The countries agreed to resume production from the shared area called the Neutral Zone after a five-year dispute and hiatus, where two fields of Khafji and Wafra used to produce 500,000 bpd or 0.5 per cent global oil supply before the shutdown.

Khaled Al-Fadhel, Kuwait's oil minister, speaking at parliament during the National Assembly session, said the deal would allow Kuwait to produce 500 million cubic feet per day of natural gas, representing the country's share in Al-Durra oil field, according to state news agency KUNA.

Additionally, Kuwait will also see an increase in crude oil and natural gas reserves, as well as a new marine route to export its share of oil in the Divided Zone. The two countries also agreed to execute joint offshore and onshore projects in the area and developing joint fields as well.

Separately, increasing Kuwait's production capacity will not affect the country's commitment to supply-reduction quotas under the OPEC+ production cut agreement, the minister said.

Kuwait and Saudi Arabia as members of the Organization of Petroleum Exporting Countries (OPEC) along with Russia agreed to deepen production cuts this year to support oil prices.

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Samsung, Técnicas win $3.7 bln Algeria refinery project

South Korea's Samsung Engineering and Spain's Técnicas Reunidas joint venture won a US$3.7 billion contract for the Sonatrach Hassi Messaoud (HMD) refinery project in Algeria.

The refinery plant will process 110,000 barrels of crude oil per day and will be executed on an Engineering, Procurement, Construction and Commissioning (EPCC) lump-sum turn-Key basis for approximately 52 months.

The project is located at Hassi Messaoud, 600km southeast from the Algeria's capital Algiers.

The signing ceremony was attended by Kamel Eddine Chikhi, Sonatrach President & CEO, Juan Lladó Arburúa TR Vice Chairman & CEO and Sungan Choi, Samsung Engineering President & CEO.

The scope of work includes Process & Utility Unit, Crude Distillation Unit (CDU)/ Vacuum Distillation Unit (VDU), Continuous Catalytic reforming (CCR) Unit, Isomerization, Naphtha Hydro-treating (NHT) Unit, Hydrodesulfurization (HDS) Unit, Hydrocracker Unit (HCU) as well as Utility Systems.

Sonatrach roadmap is to invest heavily in petrochemicals as well as in oil and gas development, which will give Samsung Engineering the opportunity to be part of Sonatrach's value chain from the very beginning of the process.

In addition, Samsung Engineering will execute the HMD refinery project with Técnicas Reunidas as JV partner.

Saudi Aramco IPO tops $29 bln after over-allotment of shares

Saudi Aramco has allocated 450 million additional shares as part of its 'over-allotment option' that boosts its total initial public offering (IPO) value to US$29.4 billion.

Early in Dec., the energy giant raised $25.6 billion in a record listing, pushing Alibaba from the top place.

Saudi Aramco said no new shares have been issued for the over-allotment option as the shares were allocated to investors during the book building process - which also determines the IPO price. The option is kept in case there is a greater demand from investors during the IPO.

After listing at the top of the range of SAR 32 on Saudi Arabia Stock Exchange (Tadawul), Saudi Aramco shares were volatile amid Middle East tension but stayed above that price and closed at 35 riyals on Jan. 9.

Goldman Sachs, as the stabilising manager for the offering, had the option to purchase as much as 450 million shares of the total issued 3 billion shares if the share price required to do so during the first four weeks of the listing.

Goldmas Sachs Saudi Arabia will not hold any shares in the company as a result of exercising the over-allotment option and it has not done any stabilisation in relation to the offering of Saudi Aramco shares, the bank's Saudi unit said in a Saudi Aramco statement.

ADNOC, Pertamina to explore building refining complex

Abu Dhabi National Oil Company (ADNOC) and Indonesia's Pertamina signed a preliminary agreement to explore the potential development of a crude to petrochemicals complex in Balongan, Indonesia.

The entities also signed a sales agreement for ADNOC to supply Pertamina with up to 528,000 MT of LPG by the end of 2020, ADNOC said in a statement.

Additionally, Chandra Asri and ADNOC signed a MoU to explore potential supply of naphtha to Chandra Asri in Indonesia that would be utilised as a feedstock for their current and potential new cracker complex in Indonesia.

The value of the agreements was not disclosed.

The agreements were signed between the companies involved

and witnessed by His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, and Joko Widodo, President of the Republic of Indonesia.

His Excellency Dr. Sultan Ahmed Al Jaber, UAE Minister of State and ADNOC Group CEO, signed each of the agreements, while Nicke Widyawati, Pertamina president director and CEO and Erwin Ciputra, Chandra Asri president director signed on behalf of Pertamina and Chandra Asri, respectively.

H.E. Dr. Al Jaber said: "The agreements signed with Pertamina and Chandra Asri will potentially help ADNOC to secure additional in-market presence in one of Southeast Asia's fastest-growing economies, enabling new domestic value-creation opportunities across the hydrocarbon chain. This announcement is a testament to the success of ADNOC's international partnership strategy, our ability to consistently deliver innovative value-creation opportunities and the UAE's strong ties with the Republic of Indonesia."

Mubadala Petroleum completes farmout in Indonesia

Mubadala Petroleum announced that it has completed the farmout of a 20 per cent participating interest in each of the Andaman I and South Andaman Gross Split Production Sharing Contracts (PSCs) to Premier Oil following Indonesian Government approvals.

Following completion, Mubadala Petroleum, as operator, has an 80 per cent participating interest in each of the Andaman I and adjacent South Andaman PSCs, with Premier Oil holding the remaining 20 percent participating interest in the two blocks.

Mubadala Petroleum is also a partner with a 30 per cent participating interest in the Andaman II Gross Split PSC, which is operated by Premier Oil.

With participating interests in these three adjacent blocks, Mubadala Petroleum is the largest net acreage holder in the area, securing the core of the underexplored but proven North Sumatra basin offshore Aceh for future exploration growth.

McDermott restructures debt, files Chapter 11 bankruptcy

McDermott has finalised a pre-packaged restructuring of its massive debt, which will see the oilfield services company file for bankruptcy protection under Chapter 11.

The restructuring will be financed by a debtor-in-possession (DIP) facility of $2.81 billion. As part of the deal, McDermott has also agreed to a stalking-horse offer sell its Lummus Technology unit for $2.73 billion.

Texas-based McDermott said the restructuring will eliminate $4.6 billion of debt. Its total debt stood at $9.86 billion as of Nov. 4, 2019.

DIP financing packages allow bankrupt companies to remain in business and fund operations as bankruptcy case proceeds.

The company also has secured committed exit financing of over $2.4 billion in letter of credit facility capacity and will emerge from Chapter 11 with approximately $500 million in funded debt.

McDermott expects the DIP financing, combined with cash generated by McDermott, to enable the company to stabilise its cash flows and continue operating.

The growing circular economy

Rachael Bartels, senior managing director, Chemicals & Natural Resources, Accenture, on plastics and sustainability

Amid a growing focus on all things related to plastic waste, environmental protection and consumer activism are starting to not only dominate social agendas but also incentivise companies to pivot and adopt new business models. According to Accenture research, while consumers remain primarily focused on quality and price, 83 per cent believe it's important or extremely important for companies to design products that are meant to be reused or recycled. Nearly three-quarters (72%) of respondents said they're currently buying more environmentally friendly products than they were five years ago, and 81 per cent said they expect to buy more over the next five years.

New regulations imposed by governments – including the European Union ban on single-use plastics by 2021 and the goal for all plastics to be recyclable or reusable by 2030 – as well as existing sustainability measures in several countries, will impact the industry as a whole. Manufacturing and petrochemical companies that fail to adopt more sustainable measures stand to lose sizable profits; however, these same firms also stand to gain the most from them.

Sustainable principles, as well as new government restrictions, will help drive the circular economy. Replacing the 'take-make-dispose' model that has been prevalent for decades with an approach focused on designing for reuse and the constant recycling of materials will inevitably fuel industry growth.

With the end consumer in mind, industrial firms can realign their offerings, engage customers, and inspire their workforces to break down traditional silos and push the boundaries. This will help develop smart products, drive open innovation, share knowledge, and establish ecosystems and new networks of partnerships. This approach will allow chemical companies to generate added value by controlling the molecule lifecycle and enabling downstream circularity. Circularity

involves implementing new business models, including renting rather than selling molecules. Reinvention can help businesses achieve their growth and profitability goals as well as demonstrate their ability to face inevitable disruptions in the industry.

Employing a circular model opens up significant growth prospects. As the American Chemistry Council estimates, advanced technologies that convert used plastics into new products, including fuel, could create almost 39,000 jobs in the U.S. alone, charting a new sustainable growth path.

The way forward

Oil and gas and petrochemicals are among the sectors that stand to gain or lose the most from the current drive to recycle or ban single-use plastics or replace them with reusable products. Companies in these domains are uniquely positioned to capitalize on plastics recycling. No other industry can match their access to recycled waste materials in their business segments, as well as their operational skills, capital strength, in-depth product knowledge, research and development, and marketing capabilities, and links to infrastructure, including rail, ports, and roads.

To comply with new regulations and become more environmentally conscious, these companies should consider recycling multiple polymer waste streams, including rubber and composite materials and textiles, in addition to single-use plastics. This will likely require returning processed and unprocessed waste to an integrated refinery or petrochemical plant for sorting, cleaning, and grinding down to produce chemicals.

Existing plants are ideal for incorporating recycling technology. Petrochemical firms can easily integrate chemical recycling, pyrolysis, and gasification to transform durable and non-durable plastics into polymer raw materials, and other chemicals or fuel to help power site assets. They can also scale and optimize recycling efforts at an impressive level – another advantage that is not necessarily available to other industries.

Because of growing consumer and regulatory trends, as well as the strong positioning of the oil and gas and petrochemical companies, it is time to act now and transform today's businesses.

As explained in Accenture Strategy's book 'Waste to Wealth: Creating Advantage in a Circular Economy,' the first step is to realise that there is no single right answer for every company. A recurrent lesson is that each firm must carefully choose its business model and make sure it can access the key enabling technologies to support and scale the model. Only through doing so can companies develop all the right capabilities to allow them to operate according to circular economy principles effectively.

Not as far as it should. While the necessary technologies are mostly available and awaiting integration, the biggest challenges may be in the supply chain and from consumers who are at the end of the delivery chain. Moreover, there is a need for strong collaboration, especially with integrated petrochemical companies, waste management firms, and governments.

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Is the upstream sector spending enough?

Upstream spend on development and exploration is a barometer of the industry's mood, so how do things look for the sector this year? Simon Flowers, Wood Mackenzie's chief analyst, takes a look

What do we think global spend will be this year?

We expect development expenditure of around US$450 billion this year. That's about 8 per cent above the 2016 low, but flat year-on-year and 40 per cent below the peak of 2014.

Is the industry spending enough? That's the big question on our minds at Wood Mackenzie. Companies are still extremely cautious, with capital discipline the order of the day. Budgets are tightly controlled, though service sector costs are still low so there's more bang for buck. Despite the fall in spend, supply of oil and gas has continued to surprise on the upside. Whether that holds true into the mid-2020s depends on whether Permian tight oil delivers the growth we expect.

Where are the opportunities?

Development outside the U.S. Lower 48 is robust, up around 4 per cent to $352 billion this year. We predict a healthy crop of conventional FIDs of around 40 projects; below the 2018 peak of 54, but up on last year and the second-highest since the downturn. These hold 34 billon barrels of oil equivalent (boe) of resource with total spend of $220 billion, in line with the 2018 high-water mark. The average project size at over 800 million boe is also a bit higher.

Which segments are growing?

Liquefied natural gas (LNG) is on a major growth spurt. The market is heavily oversupplied at present, but the industry needs to develop new LNG supply to meet growing demand. Last year saw a record 71 million tonnes per annum (mmtpa) of new capacity sanctioned, including December's go-ahead for Nigeria LNG Train 7. 2020 could match that number with big projects in the U.S. and Mozambique. Spend on upstream LNG projects in 2020 will be up 50 per cent on 2019 to over $30 billion (excluding non-integrated plant spend). There's a concern about cost pressures after the squeeze early last decade, when new build was concentrated on Australia. This time, there's a wider geographical spread and spare capacity in fabrication yards.

And which are going backwards?

U.S. unconventionals will feel the pinch. We expect that spending in the U.S. unconventionals sector will fall by more than 10 per cent in 2020, with tight oil and shale gas both down. There's still plenty of tight oil inventory with breakevens below $50/bbl, mainly in the Permian. But investors have tired of years of negative cash flow and 'jam tomorrow'. Many of the independents that dominate tight oil production are being forced to reduce spend and, instead of pursuing growth, deliver free cash flow and dividends. The Majors, led by ExxonMobil and Chevron, don't have the same constraints and will increase investment.

The net effect is lower spend and lower average rig count. This will lead to monthly year-on-year tight oil production growth falling to virtually zero by the end of this year, albeit temporarily. It's a far cry from the rampant growth of the last few years. With Henry Hub prices depressed, cash flow for unconventional gas players is also under pressure and spend will decline.

Upstream:

Development outside the U.S. Lower 48 is robust, up around 4 per cent to US$352 billion this year

LNG:

2019 saw a record 71 million tonnes per annum (mmtpa) of new capacity sanctioned

U.S. Unconventionals

We expect that spending in the U.S. unconventionals sector will fall by more than 10 per cent in 2020

Is exploration spend increasing as returns improve?

No, the opposite. We expect a drop of 15 per cent, to around $30 billion, meaning spend in 2020 will be just one-third of the $93 billion 2014 peak. The continued drop in spend comes despite improved exploration economics – we expect full cycle returns of 12 per cent to 15 per cent in 2020, the fourth straight year of value creation.

Conventional exploration is inherently high risk and vulnerable when capital is constrained. Fewer companies are exploring, with smaller explorers struggling to raise risk capital. Another reason spend is declining in 2020 is that well commitments have fallen away. We aren't yet seeing companies rein in exploration directly because of risks posed by the energy transition, though that will come. We reckon $25 billion to $30 billion may be the new normal for undisturbed global exploration spend for the next few years.

Will the earlier January spike in oil price change anything?

It's unlikely to do so. The geopolitical tensions behind the January jump in Brent increase uncertainty and, if anything, weaken the case for discretionary investment. The industry has a reputation for short-termism but, in 2020, will be at pains to convince investors it won't fall into the trap of loosening capital discipline. Any surplus cash flow generated by higher prices will most likely be returned to shareholders as buy-backs are used to pay down debt.

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Global rig count extends declines as U.S. drillers cut cost

By: Nadia Saleem, Editor, Pipeline Oil and Gas News

Global rig count extended its downtrend in the last two months of 2019, with U.S., Europe and Canada all seeing significant reduction in drilling activity.

From October to December, U.S. cut 44 rigs, Europe dropped 36 and Canada reduced its rigs by 10.

Rigs in U.S., which make up almost half of the world's total rigs, extended declines for 12 straight months of 2019 as companies cut expenses to boost efficiency from each rig to deliver more value to shareholders, data from Baker Hughes' closely followed report showed.

At the January 24 count, rigs in U.S. were slightly lower, bringing the country's rig count to 794.

Oil rig count is an early indicator of future output but even though the rig count has declined, oil output has continued to increase in part because of productivity improvements.

Manu U.S. oil and gas operators have reported lower 2019 CAPEX with higher production estimates for the year. It is expected that 2020 CAPEX will be lower than 2019, but many are still predicting production growth. Smaller players are struggling with liquidity issues, which will contribute to offsetting continued production growth from the larger operators as well as majors.

The U.S. Energy Information Administration projected U.S. crude output will rise to 12.2 million barrels per day (bpd) in 2019 and to 13.3 million in 2020 from a record 11.0 million bpd in 2018.

However, oilfield services companies in U.S. are putting up assets for sale to counter a decline in shale drilling activity. Schlumberger, Halliburton Co and Baker Hughes have recently revealed plans to review operations in light of declining demand for their services.

Oilfield service providers are facing reduced spending by oil and gas producers as investors push for higher shareholder returns rather than more drilling activity. Competition also

is forcing service companies to exit less profitable businesses.

"As operators continue to be constrained by free cash flow generation capabilities, they will take a more modest approach to their activities in the coming years, but lower service costs and productivity will keep some of the growth alive," analysts at Enverus said in their latest report.

Middle East rig count still rises

Meanwhile, the rest of the world saw a slight change upwards with the Middle East adding six rigs, Latin America adding two rigs and Africa also adding two rigs. Asia Pacific was flat.

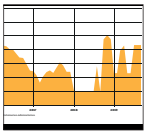
Global demand outlook has taken a hit following weak China economic growth and concerns over a U.S.-China trade dispute, which abated somewhat after a 'phase one' deal.

The Organization of Petroleum Exporting Countries (OPEC) slightly raised its 2020 demand outlook on back of an improving economic outlook for the year in its latest report - total world oil demand is now projected to rise from 99.77 million bpd in 2019 to 100.98 million bpd in 2020.

In December, OPEC, with Russia and other allies agreed to deepen oil output cuts to remove 2.1 million barrels per day until the end of March to prevent inventories building up. This has also had an impact on the Middle East's region's speed of drilling activity ramp-up plans.

In recent weeks, OPEC said it expects demand for its oil to slip this year by 0.1 million bpd from last month's forecast to stand at 29.5 million bpd. This is around 1.2 million bpd lower than the 2019 level. Meanwhile, it expects demand for non-OPEC oil to go up.

Rig counts are closely followed as they are an important business barometer for the drilling industry and its suppliers. When drilling rigs are active they consume products and services produced by the oil service industry. The active rig count acts as a leading indicator of demand for products used in drilling, completing, producing and processing hydrocarbons.



EGYPT OIL & GAS REPORT

FEBRUARY 2020

DRAGON OIL LOOKS AT NEW GROWTH FOR EGYPT

In an exclusive interview with Pipeline Magazine's **Nadia Saleem**, UAE's Dragon Oil CEO **Ali Al Jarwan** speaks about the company's operations and plans for Egypt

Dragon Oil just acquired shares in Egypt's Gulf of Suez Petroleum Company's concession. What plans do you have to boost production there?

The strategy to enhance production from the concession underpins improving delivery from existing wells, drilling of new wells and improving the overall on-stream processes. Dragon Oil is mobilising a sufficient number of capable rigs to fulfil its work-programme. For improving the success factor of new wells, we have launched the acquisition of 3D seismic data and its analysis. Major machinery overhauls are also being expedited and integrity maintenance programs are being enhanced to ensure a very high level of safety and smooth operation.

In addition to the above, Dragon Oil plans to drill exploration wells in new areas, where we hope to add production from.

How does this fit in with the company's Egypt strategy?

Our entry into the Egypt's energy sector was in 2014 with the acquisition of East Zeit Bay exploration block. Now, we want to partner with Egyptian General Petroleum Corporation (EGPC) in their quest to sustain and increase the domestic production of hydrocarbons. So the acquisition of Gulf of Suez assets fits in very well with strategic growth objectives of Dragon Oil in Egypt. Additionally, we are delighted to work with GUPCO (Gulf of Suez Petroleum Company) to achieve improved recovery from mature fields.

What plans do you have to further your footprint and investment in Egypt?

We will continue to explore opportunities to further enhance our partnerships and footprint in Egypt. We shall focus on acquiring working interest in producing fields and in promising prospects for exploration.

What is your market outlook for the country?

The current crude production is fully consumed locally due to the country's needs. The demand remains high for the country and the government is supporting additional investments to increase production and satisfy local market needs.

How do you think Dragon Oil can help Egypt's ambitions for becoming a regional energy hub/reaching self-sufficiency in petrochemical sector?

Dragon Oil's ambitions are very much aligned with Egypt's – that is to grow production for satisfying domestic demand and eventually becoming a net exporter following self-sufficiency.

Are you looking at new partnerships or taking part in concession awards?

Dragon Oil is open to exploring all opportunities and we track the bids offered by the government and we are willing to have partners as long as Dragon Oil can hold operatorship.

What is your business outlook for Egypt's energy sector?

Egypt has become a hub in Africa as it develops its oil and gas reserves -this provides new project opportunities for oil and gas companies to tap into. That's why companies are looking to invest and develop these projects to further expand their portfolios and market position. This is evident from the successful annual Egypt Petroleum Show (EGYPS) where ENOC and Dragon Oil participate – this helps us stay connected with the country and the existing investor to share experiences and knowledge from Egypt's energy sector.

What challenges do you think need to be addressed to help Egypt's growth in the energy sector?

Egypt has a significant upside potential when it comes to energy sector development opportunities. However, there are some key issues, which if resolved or improved, will be able to help propel Egypt's growth swiftly.

One of the key issue is that the country still has fuel subsidies, which pose pressure on pricing and profitability of producers. Additionally, there is much room for improvement in available financing for energy projects. Also, new players coming into the Egypt market need facilitation so they can take advantage of the many opportunities present in order to boost the country's competitiveness.

How important is the country for your regional growth plans?

UAE has a long-standing relationship with Egypt, which has geo-political stability and a proven history of working well with international partners. So it is very natural for us to assign very high priority to Egypt in our ambition to increase our regional production portfolio.

UPSTREAM: FROM DECLINES TO RICHES

By: **Nadia Saleem**, Editor, Pipeline Oil and Gas News

The discovery of a giant gas field in Egypt's Eastern Mediterranean waters in 2015 triggered a dynamic change in the country's oil and gas sector.

While the discovery was important for the much-needed gas to satiate burgeoning domestic demand and shore up finances through exports, it also triggered a spat of new exploration and production auctions in hopes the country could develop new energy resources.

In the years following the 2011 political unrest, the country's investment environment took a hit in multiple ways. As sentiment was negatively affected by political turmoil, foreign reserves took flight, which resulted in financial disarray for the government's treasury. This fuelled a build-up of government arrears for IOCs that exacerbated the cautious foreign investment appetite.

Meanwhile, restrictive regulations also limited the potential for growth for the oil and gas industry.

In recent years however, the government of President Abdel Fattah el-Sisi has prioritised improving the country's finances through foreign aid and the energy investment environment by clearing IOC debts, opening up the gas market, as well as launching new auctions for new exploration and production blocks.

Arrears to international oil and gas companies peaked at 6.2$ billion in 2012, and stood at 1.2$ billion in July 2019.

Egypt liberalised its gas market as part of broader economic reforms, which the government implemented to receive a US12$ billion economic bailout from the IMF. This included cutting gas subsidies that has helped support gas prices.

The gas liberalisation now allows private companies to participate as producers and sellers, which means that The Egyptian Natural Gas Holding Company (EGAS) is no longer the only supplier. Upstream producers with contracts signed post2013- will be able to sell their profit share gas on to end users and private companies will also be able to import liquefied natural gas (LNG) and piped gas.

The Petroleum Ministry's pragmatic approach to gas pricing has secured over 28$ billion in new gas field investments since 2015, at a time when investment in other regions has been slashed.

New payment structure

Separately, Egypt is unofficially working on a new payment structure for oil and gas producers, whereby they will be able to control the sales, instead of selling to the government at a fixed market price.

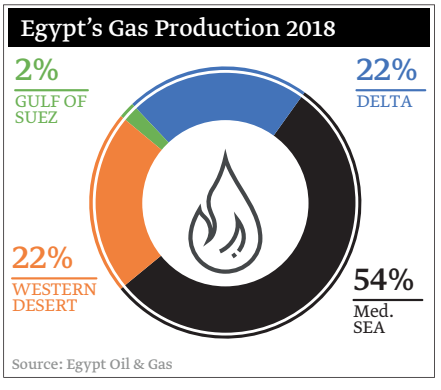
Following the gas liberalisation, IOCs were concerned the gas price structure remains unclear and would impact the competitiveness of their gas. The new payment structure would address this gap in the regulatory framework of the energy sales arena.

Historic concessions auction

In early 2019, the Egypt government awarded 12 concessions in the country's largest ever oil and gas auction. A total of eight international companies were awarded contracts as part of the Egyptian General Petroleum Corporation (EGPC) and EGAS 2018 international licensing rounds.

The EGAS' bid round, which was the largest in its history, included border areas in the Mediterranean Sea as well as land areas in the Nile Delta.

Five gas exploration concessions were awarded - in which 20 wells are to be drilled - to Shell, Exxon, Petronas, BP, DEA and Eni.



EGPC's tender meanwhile included areas in the Western Desert, the Nile Valley, the Gulf of Suez and the Eastern Desert. Neptune Energy, Merlon, Shell, Eni and state-controlled EGPC were awarded seven oil exploration concessions in total in which 39 wells are planned to be drilled.

The awards were estimated to bring in an investment of at least 750$ million to 800$ million in the first stage of exploration in the total of 12 concessions, according to Tarek El Molla, Egypt's Minister of Petroleum and Mineral Resources.

The awards also marked U.S. major ExxonMobil's entry into gas exploration in Egypt, joining other international oil companies.

Meanwhile, south of the prolific Gulf of Suez hydrocarbons area, the Red Sea is a new focus for the government; Chevron, Shell and Mubadala were awarded exploration concessions in Dec. 2019 following an earlier-year round of auctions.

Discoveries and production

Egypt's production was in a state of decline as fields matured, profitability declined and new investments were limited – it swung from being the the world's eighth largest LNG exporter in 2009 to the world's eighth largest LNG importer in 2016.

But the story changed drastically following the 2015 discovery of the offshore natural gas field Zohr, in the Shorouq concession by Italy's Eni– which is said to be the largest ever discovery in the Mediterranean Sea.

With Zohr, the oil and gas industry came in the limelight and the government launched a fast-track plan to rejuvenate the energy industry. Following the new concession awards, the North African country has seen a ramp-up in production even as Egypt embarked on plans of setting up a regional energy hub in coordination with neighbouring countries around the Mediterranean for supplies to Africa as well as Europe.

Egypt's upstream activity is focused in

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four major areas; the Mediterranean Sea, the Nile Delta, the Gulf of Suez and the Western Desert basins.

Mediterranean Sea

The Zohr gas field has a whopping gas reserves estimates of 30 trillion cubic feet, which easily doubled Egypt's total gas reserves. After production started in Dec. 2017, this was quickly ramped up to hit 2.7 billion cubic feet per day (bcf/d) in August 2019. Italian major Eni as co-operator, had announced plans to lift this to 3.2 bcf/d by the end of 2019.

The overall investment in the project is estimated to be approximately 12$ billion.

Eni, in its third quarter earnings report said it expects new field start-ups and ramp-ups to add approximately 250,000 barrels of oil equivalent per day (boe/d) of new production globally in 2019, but this will be mainly related to the Zohr field.

The main stake holders in the Shorouq concession where the Zohr field is located are Eni's subsidiary IEOC (50 per cent), Rosneft (30 per cent), BP (10 per cent and Mubadala Petroleum (10 per cent).

Separately, Eni announced a new gas discovery in the Nour prospect in Eastern Mediterranean in early 2019.

The JV Operator will start the feasibility studies to accelerate development of these new resources after finalising the discovery evaluation.

In the concession, which is in participation with EGAS, Eni is the operator with a 40 per cent stake, BP holds a 25 per cent stake, Mubadala Petroleum a 20 per cent stake while Tharwa Petroleum Company a 15 per cent stake of the contractor's share.

Nile Delta

Meanwhile, the West Nile Delta (WND) Project involves the development of five main gas and condensate fields located within the North Alexandria (N Alex) and West Mediterranean Deepwater concessions in the Mediterranean Sea, approximately 65km to 85km off the coast of Alexandria, Egypt.

Spanning two offshore concession blocks, the gas and condensate fields are being developed in phases. The first phase involves the development of five major fields namely Taurus, Libra, Giza, Fayoum and Raven.

Peak production from the project in 2019 was expected to reach 1.4 bcf/d of gas, which is equivalent to approximately 20 per cent of Egypt's current gas production. This is estimated to attract an investment of 12$ billion during the first phase of development.

The Maadi, Viper, Ruby, Polaris and Hodoa discoveries will be developed in later phases.

BP is the operator, holding 60 per cent interest in the N Alex concession and 80 per cent interest in the West Mediterranean Deepwater concession with RWE DEA partnering with holding the remaining interest.

Gulf of Suez

Eni announced the discovery of new resources in the Abu Rudeis Sidri development lease, in the Gulf of Suez. The Sidri South discovery, which is estimated to contain about 200 million barrels of oil in place, will be reassessed following these new results. The field's operating company is Petrobel, equally held by Eni and by EGPC.

Western Desert

Eni announced that production from South West Meleiha development lease, located in the Western Desert, has started. In addition, two near oil fields have been discovered in the Meleiha development lease in Western Desert.

The company had expected production to be boosted around 7,000 boe/d in September.

EGYPT AIMS FOR DOWNSTREAM INDEPENDENCE

By: **Nadia Saleem,** Editor, Pipeline Oil and Gas News

Even as Egypt steams ahead with facilitating investments in the upstream sector to develop its hydrocarbon resources, it has also embarked on a major journey to upgrade its established but lagging downstream industry so ensure petrochemical self-sufficiency for the nation.

While gas exports are rising thanks to new discoveries, Egypt still has to import much of the oil products it needs for heating, transportation and power generation.

To this end, Egypt plans to increase domestic refined products production to 41 million tonnes a year, according to Egypt's Minister of Petroleum and Mineral Resources Tarek el-Molla. As of early 2019, the country had eight refineries with a capacity of 38 million tonnes, of which only 25 million tonnes are utilised.

The North-African nation's petroleum ministry revealed plans to make the country self-sufficient by 2023. To achieve this, it announced plans to upgrade refineries to boost production of fuels such as gasoline, gas oil, LPG (liquefied petroleum gas) as well as petrochemical products.

The ministry's plan includes six new projects with investments of about US7$ billion, said el-Molla.

The new projects include Midor refinery expansion in Alexandria, a high-octane gasoline production plant in Assiut, ANOPC complex for gasoline, gas oil and LPG production in Assiut, the Red Sea Refining and Petrochemicals Complex in Suez, as well as the LPG and asphalt production units in Suez.

Additionally, Egypt is looking at feasibility studies to set up a massive complex for refining and petrochemicals in the New El Alamein city, which will see investments of about 8.5$ billion. This complex project aims at producing around 1.5 million tons of specialised petrochemicals and around 1.9 million tons of petrochemical products such as butane gas, Kerosene, Mazot and diesel.

For petrochemicals specifically, Egypt is planning four new projects, with investments of about 2$ billion to add new production capacities as well as increasing and diversifying the products provided. These will include the following projects:

- formaldehyde production, Damietta Port (Suez Company for Methanol Derivatives)
- polybutadiene production, Ethydco Complex, Alexandria (Egyptian Ethylene and Derivatives Company)
- Propylene and polypropylene production, Alexandria (Sidi Kerir Petrochemicals Company)
- medium-density fiberboard (MDF) production

Refinery expansion updates

In recent years, Egypt has carried out a few refinery expansion programmes and two of the largest petrochemical complexes have contributed to the increase in production by 80 per cent in 2018-2015, compared to the period from 2015-2011.

Among the expansions is Egypt largest downstream undertaking in the refining project in Mostorod, with investments of about 4.3$ billion, which comes with the application of advanced technologies to boost the standard of products to meet international requirement.

While being only experimentally operational, it has already begun to impact Egypt's crude exports as the expansion of refining capacity moves the country towards becoming a net importer of crude.

This refinery expansion is also evidenced in the gradual decline of clean product imports through 2019 with the country being able to meet much of the domestic demand.

Meanwhile, the Middle East Oil Refinery Co.'s (Midor) -115,000bpd refinery in El Amreya Free Zone, Alexandria has seen the finalisation of the contract for engineering, procurement and construction. This includes the following work: expansion, debottlenecking of existing units and delivery of new units including a crude distillation unit, vacuum distillation unit, hydrogen production plant, various process units, interconnecting, off sites and utilities.

Starting in 2022, the modernised complex will exclusively produce Euro 5 products, with a 60 per cent increase in the refinery's original capacity to 160,000 bpd of crude oil, according to contractor TechnipFMC although the energy ministry had said the project, which would cost a total of 2.2$ billion, would increase crude processing capacity at the site to up to 175,000 bpd.

Alongside increasing Midor's crude processing capacity, the expansion will also raise the refinery's current LNG production by about 145,000 tonnes per year (tpy), benzene 95 by about 600,000 tpy, and jet fuel by about 1.3 million tpy.

Previously, Egypt's Midor refinery was equipped to handle one type of crude oil (light) but due to a shortage in refining capacity and limited options, some heavy crude oil was refined through refineries meant for light crude – causing damage to the equipment and reducing the life of the asset.

Investments in modification of equipment however, has helped resolve some of these infrastructure issues for Egypt to ramp up petrochemicals and fuel production, according to EPROM, the main operation and service provider for refineries and petrochemical subsidiaries of EGPC.

The company said that in 2018 it increased the crude processing capacity from 33 million barrels per year to a contraction figure of 37 million barrels per year.

In November 2019, all units of the Egyptian Refining Company (ERC) Refinery project started successful operations, on target to reach full production by the end of the first quarter of 2020.

The project aims to produce Euro V refined products including diesel and jet fuel for Egyptian consumption, by processing 4.7 million tonnes of mainly atmospheric residue from the Cairo Oil Refinery Company.

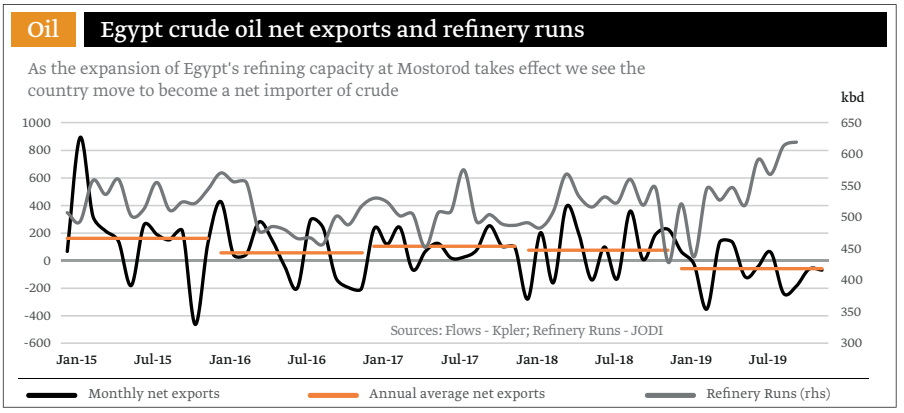
Additionally, the ERC also saw the start of operations at the hydrocracker at the flagship project that has drawn in 4.4$ billion in investments. The refinery is expected to generate EGP 55-50 billion in revenues during 2020, according to the chairman of ERC shareholder Qalaa Holdings.

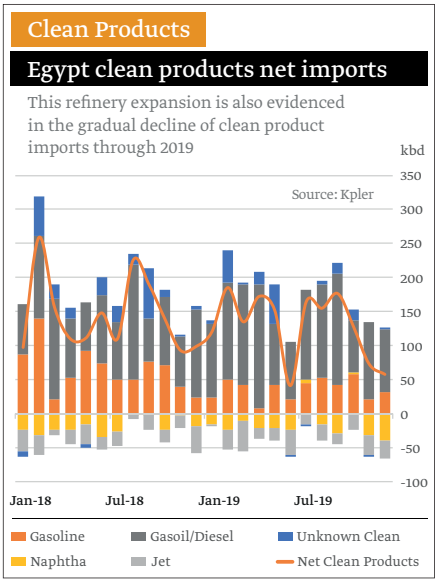
Also in November, Suez Oil Processing Company (SOPC) said it will receive a 50$ million loan from the European Bank for Reconstruction and Development (EBRD) to improve its refinery's operational efficiency and introduce cleaner fuel.

The measures are expected to help reduce carbon emissions by around 289,000 tonnes. The loan follows a previous 200$ million (155£m) loan provided by the EBRD in May 2018.

The Bank said in recent years, Egypt has struggled to balance the country's production, consumption and export of oil and gas and its support to SOPC will help "realign the supply and demand" of higher value added oil products and reduce the need for imports.

Additionally, Carbon Holdings Company is set to start receiving tranches of a loan worth 5.6$ billion to finance the Tahrir Petrochemicals Complex, which is planned to be established in Suez Canal Economic Zone. The investment cost for the petrochemical complex was estimated at 10.9$ billion.





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EGYPT'S LNG TERMINAL COMES BACK ONLINE

By: **Julian Walker**, Editor-in-chief, Pipeline Oil & Gas News

Egypt's midstream oil and gas market is in a good spot and fared better during the oil and gas market downturn. Since Egypt achieved self-sufficiency in producing gas at the end of September 2018 it has has been able to start gas exports as it looks to become a regional energy trading hub by liquefying gas and re-exporting it.

Egypt's LNG exports have rebounded in 2019 and the country's main LNG plant Idku has reached its full export capacity of 1.1 bcf/d for the first time since 2013.

Egypt's LNG exports via the 7.2 mtpa Idku plant was building up over the 2nd half of 2019, but talks regarding the restart of the country's 5.5 mtpa Damietta plant are still ongoing.

LNG exports re-starts

The Egyptian LNG (ELNG) facility is located at Idku and is Egypt's only operational LNG terminal at present, though exports are also made via pipelines.

The Idku LNG plant is located approximately 50 kilometers east of Alexandria. It consists of two natural gas liquefaction trains with a combined capacity to produce 7.2 million tonnes of LNG per annum.

Although commissioned in 2005, the Idku LNG export facility has been operating below its nameplate capacity due to a lack of sufficient domestic gas production.

The LNG terminal is capable of exporting up to ten billion cubic meters (bcm) of gas to the global market, but the company previously stated that the facility was expected to reach its full capacity by the end of 2019, with the surge in domestic gas production.

The Idku liquefaction plant has reached its full export capacity of 1.1 bcf/d for the first time since 2013. Exports have surged from 300 million cubic feet in October 2019 to one billion cubic feet per day.

Shell, Petronas, Engie, and Egypt's two main state oil and gas companies, EGAS and EGPC, are the shareholders in the Idku plant.

Damietta stalling

The Damietta LNG facility is Egypt's other LNG facility and is a -1train LNG development operated by Segas.

The facility has a processing capacity of up to 7.56 billion cubic meters and is 80 per cent owned by Spain's Union Fenosa Gas (UFG) and 20 per cent owned by the Egyptian national companies, EGAS and EGPC.

Initially UFG inked the first export deal from the Damietta plant in 2000 that had a -25year term with volumes of up to 4.4 billion cubic meters per year.

The startup of Egypt's Damietta LNG plant has been hindered by a gas supply dispute between Egypt and UFG, which operates the plant via its subsidiary Segas. UFG has been seeking compensation from the Egyptian government after it cut gas supplies to the Damietta plant in July 2012.

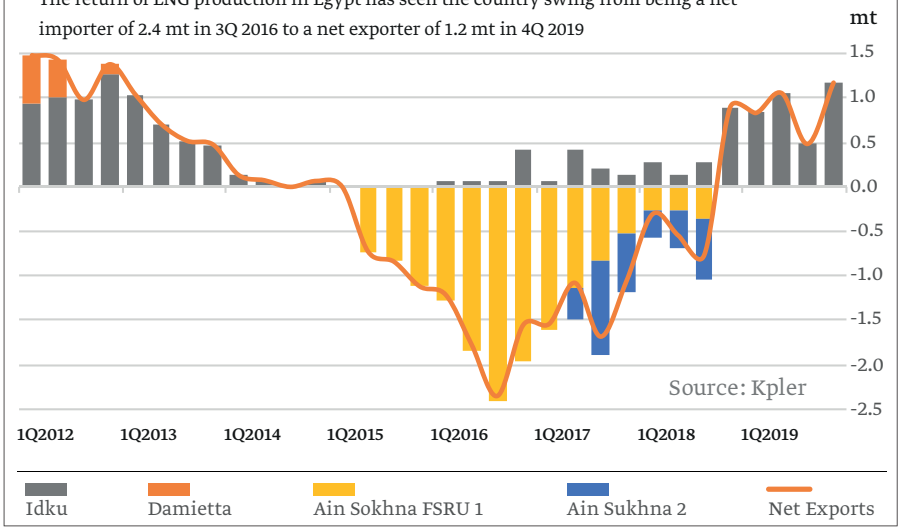
Union Fenosa, a joint venture (JV) between Italian Eni and Spain's Naturgy, took the case to the International Center for Settlement of Investment Disputes in 2014 arguing that the government had breached contract by stopping supplies.

There were reports last Autumn that the Egyptian government settled the long-running dispute with Union Fenosa regarding the halting of gas supplies to Damietta in 2012.

It was reported that Egypt would pay 2$ billion to Union Fenosa Gas Company as a settlement for halting gas supplies to the company's Damietta LNG plant in 2012. Though UFG said its negotiations with the Egyptian government over the restart of the Damietta liquefied natural gas (LNG) export plant are ongoing, however, no agreement has yet been reached.

LNG **Egypt LNG net exports**

The return of LNG production in Egypt has seen the country swing from being a net importer of 2.4 mt in 3Q 2016 to a net exporter of 1.2 mt in 4Q 2019



EGYPT'S OIL AND GAS DEMAND ON THE RISE

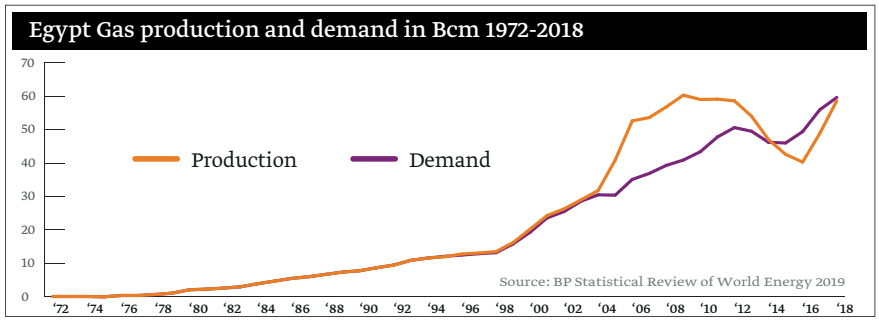
By: **Gordon Ballard**, Executive Director, International Association of Oil & Gas Producers (IOGP)

In 2018, Egypt's energy demand reached an all-time high with 94.5 million tons of oil equivalent, twice the demand of 20 years ago. Egypt has relied on oil as a fuel since pharaonic times – as revealed in ancient hieroglyphics and wall painting – so it is perhaps not surprising that more than 90 per cent of the countries' primary energy demand was met by oil and gas in recent years.

The trend of rising oil and gas demand observed in Egypt is in line with the rest of the world. Indeed, notwithstanding the growth of renewables and energy efficiency gains, in most regions of the world demand for oil and gas has continued to grow alongside that for energy. IOGP's new Global Production Report, based on BP's 2019 Statistical Review of World Energy, shows oil demand stood 30 per cent higher in 2018 than in 2000, while natural gas demand increased even more dramatically by 60 per cent during the same period.

With the exception of Europe and Central & South America where demand is stagnating or in slow decline, the report shows new records for consumption across all other world regions in 2018.

One of the most remarkable regions when it comes to oil and gas demand is Africa.



Between 1975 and 2018, demand for oil across Africa almost quadrupled from 1 million barrels of oil per day to just under 4 million barrels per day. Egypt showed the strongest demand. In 2018 it consumed 0.76 million barrels per day, a slight decline on the past few years. Egypt also leads the continent's appetite for gas, accounting for 40 per cent of Africa's demand.
While rising demand is indicative of the continent's economic growth and rising living standards, it also has a significant impact on Africa's export potential. While the continent can still export more than half of its oil production and more than a third of the gas produced, its export potential has fallen by a double digit percentage over the past 10 years due to soaring demand. As the latest IOGP Global Production Report shows, Africa's Production Indicator (PI), indicating the level of a region's self-sufficiency (with a PI above 100 per cent demonstrates the ability to export, below 100 per cent showing need to import), went down for both oil and gas: to 207 per cent for oil and 158 per cent for gas. This trend will have to be watched carefully, since oil and gas demand in Africa is expected to dramatically increase.

Egypt has certainly contributed to this trend of Africa's decreasing oil PI as the country's consumption currently outpaces the domestic oil production. Over the past decade Egypt's oil production accounted for 7 to 9 per cent of the continent's production. Still, Egypt is Africa's largest non-OPEC oil producer and increased its output in 2018 compared to 2017 by 1.6 per cent. As for natural gas, Egypt is a key country for Africa to keep its PI above 100 per cent. Thanks to – amongst others - Zohr's and Nooros' gas production, in 2018, Egypt managed to achieve virtual gas self-sufficiency. More specifically, with an output of 58.6 billion cubic meters in 2018 (a return to levels of a decade before), it boasts 25 per cent of Africa's gas production.

The oil and gas industry's continued commitment in the region and Egypt's recent announcement of new oil and gas field discoveries will certainly fit well with the country's push for growth and its need for reliable, affordable energy.

It goes without saying that IOGP looks forward to attending this year's EGYPS conference in Cairo again. We will take the opportunity to spread our vision of safe, responsible and sustainable operations both to our members in the region, as well as to potential new members who have been less exposed to our work.

Learn more about the IOGP 2019 Global Production Report: www.iogp.org/gpr.

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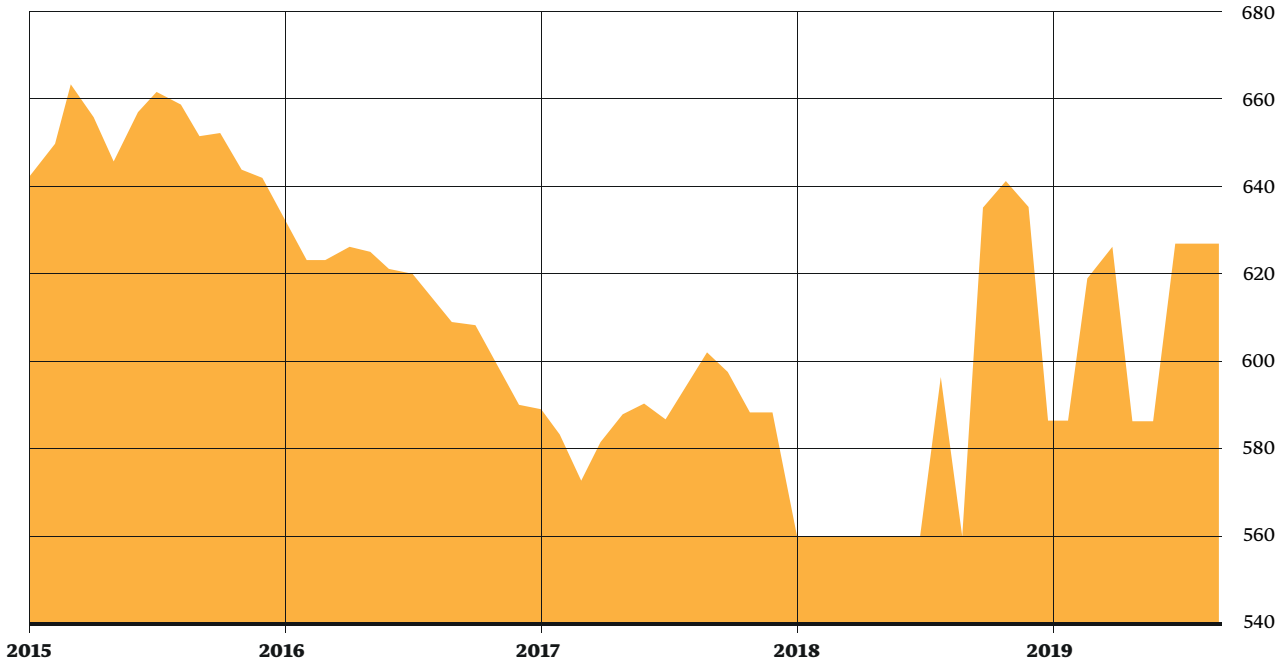
EGYPT OIL & GAS DATA

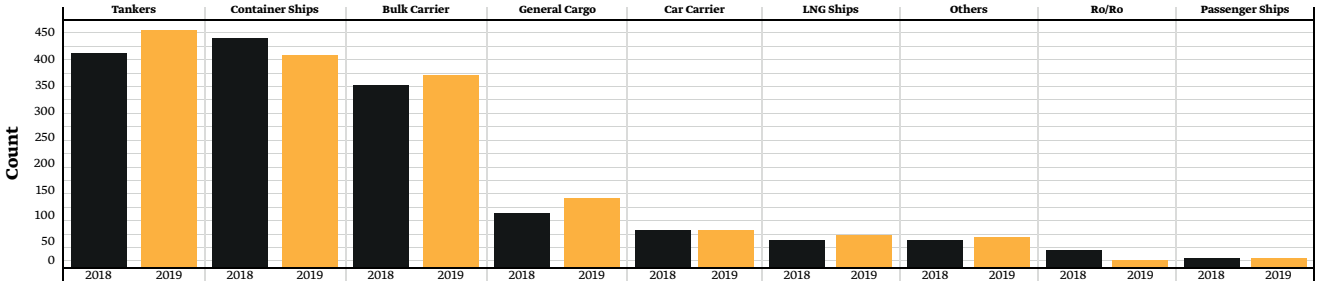
Egypt Oil Production Timeline



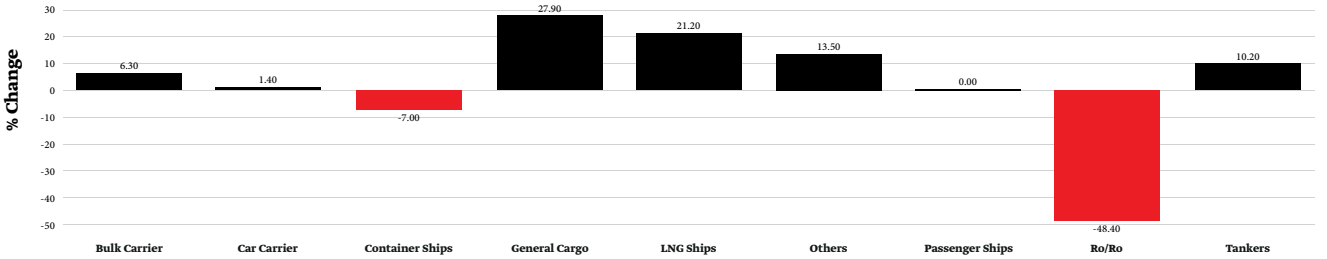
**Source: TradingEconomics.com | U.S. Energy Information Administration

Suez Canal Movements

Suez Canal Traffic Statistics by Ship Type - Year on Year (November 2018/2019)



% Change - Year on Year (November 2018/2019)



The above charts give an overview on Ship movements across the Suez Canal. The data shows Year on Year comparison across November 2018 and November 2019.

**Source: Suez Canal Authority

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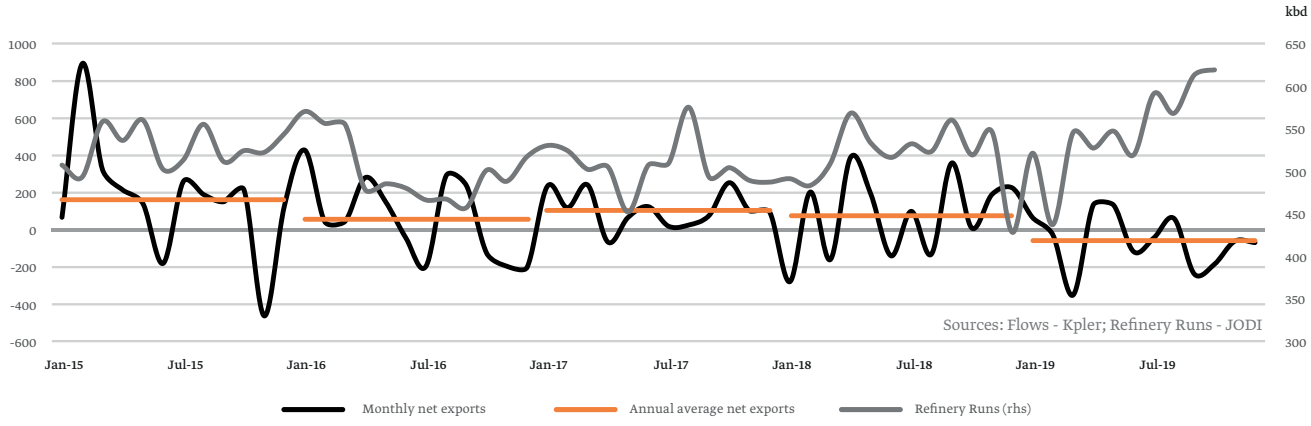
EGYPT OIL, COAL, LPG & LNG DATA

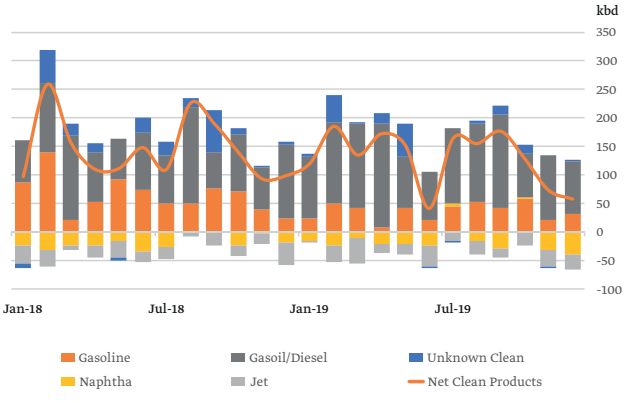
Oil — Egypt crude oil net exports and refinery runs

As the expansion of Egypt's refining capacity at Mostorod takes effect we see the country move to become a net importer of crude



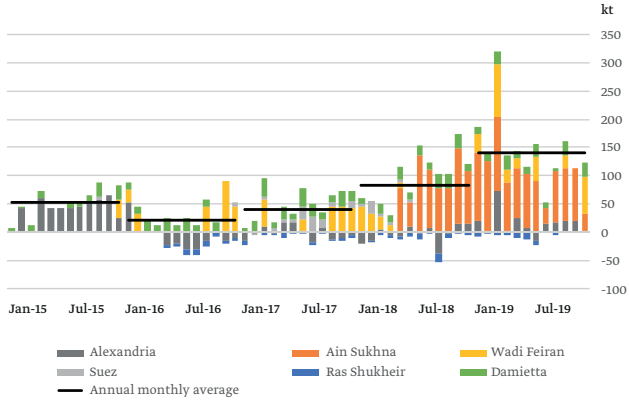
Clean Products — Egypt clean products net imports

This refinery expansion is also evidenced in the gradual decline of clean product imports through 2019



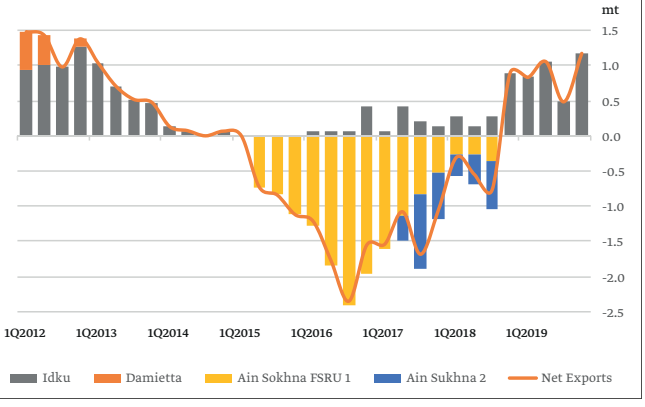
LPG — Egypt LPG net imports by installation

Over the last 4 years LPG consumption has increased steadily, hitting 140 ktm last year, up from just 20 ktm in 2016



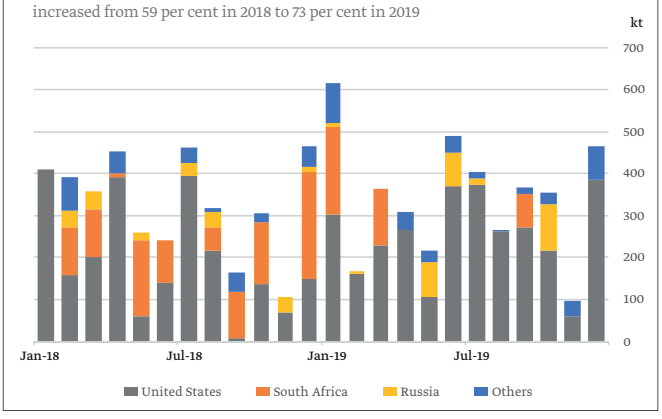
LNG — Egypt LNG net exports

The return of LNG production in Egypt has seen the country swing from being a net importer of 2.4 mt in 3Q 2016 to a net exporter of 1.2 mt in 4Q 2019



COAL — Egypt coal imports by origin

High monthly volatility in coal imports masks a small increase in total imports from 2018 to 2019. The share of these imports obtained from the United States has however increased from 59 per cent in 2018 to 73 per cent in 2019



THE RESURGENCE OF EGYPT'S UPSTREAM OIL AND GAS SECTOR

By: **Ana Severova** and **Richard Devine,** partners at Devine & Severova, a boutique oil and gas legal consultancy based in the UAE

Egypt has also implemented several helpful legal and economic reforms, such as the VAT law; reduction of energy price subsidies

The future for the upstream oil and gas sector in Egypt is looking very bright. In August 2019 the sector achieved the highest rate of crude oil and gas production in the history of Egypt - 1.9 million barrels of oil equivalent per day. This accomplishment can be attributed, in part, to the US$30 billion of investment the sector has attracted over the past five years.

The current appeal of the sector is not surprising, considering the significant new discoveries over the past few years. The discovery of the massive Zohr field by Italian energy major Eni in 2015 catalysed renewed interest in Egypt and led to several new market participants. In 2019, Egypt successfully closed one of its largest bid rounds, awarding 12 licences. The companies invested in Egypt's upstream sector now include BP, Chevron, ExxonMobil, Shell and Mubadala. The presence of majors, NOCs and independents investing in Egypt is a healthy sign of a mature sector. The majors appear to be focusing on offshore reserves but BP's sale of over $500 million of onshore assets in 2019 to Dragon Oil shows the onshore market remains dynamic and of long-term interest. The new offshore gas discoveries, together with proximity to other East Mediterranean gas reserves and the gas demand in European markets, augur well for Egypt's development as a regional natural gas hub.

Attracting foreign direct investment into the country's energy sector is a political priority for the Egyptian government. The government has undoubtedly improved the investment landscape by substantially reducing the overdue receivables owed to foreign oil companies. The arrears accumulated following the Arab Spring in 2011 ($6.3 billion in the 2011/2012 fiscal year) were reduced to $900 million by the end of June 2019, and the remaining amount is expected to be paid soon.

Egypt has also implemented several helpful legal and economic reforms, such as the VAT law; reduction of energy price subsidies; floatation of the Egyptian pound; and the removal of investment barriers to stimulate local and foreign investments. On the legal front, the new Gas Law No. 196 of 2017 (the Gas Markets Law) and executive regulations

were promulgated with the aim of liberalising the downstream gas market in the country.

In this article, we provide a legal perspective on the terms applicable to upstream investments.

Advantages and disadvantages of the Egypt's concession model

In Egypt, concessions to explore and produce oil and gas are typically held by one of the Egyptian state-owned oil companies (EGPC, EGAS or GANOPE). EGPC, EGAS or GANOPE then contract with one or more international oil companies (the **Contractor**) to exploit the concession area. Although the agreements governing this are called concessions, they are in fact production sharing arrangements. Concessions are awarded through competitive bid rounds and provide that the Contractor bears all the risks involved in exploring and developing crude oil or natural gas from the concession area in return for cost recovery and a production share if a commercial of discovery hydrocarbons is made.

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Concessions are not solely contractual arrangements; they are enacted into law and can only be amended by the Egyptian Parliament. Terms of the concession prevail over any conflicting legislation. This means that concessions are subject to detailed legislative scrutiny, and any amendments are subject to legislative approval. Copies of the EGPC model concession (the **Concession**) are available on its website and we comment on some of the key features below. EGAS and GANOPE also have their own forms of model concession, which are very similar. Because concessions are enacted into law, the terms are publicly available.

Fiscal terms

The Egyptian government receives royalties from the Contractor (in cash or kind) equivalent to 10 per cent of the total quantity of petroleum produced and saved from the concession area. EGPC generally pays royalty and income tax on behalf of the Contractor out of its share of production (although see comments below).

Fiscal terms are stabilised, and the contractor can renegotiate the terms if its economic benefits are eroded due to new laws or regulations in Egypt.

Marketing of hydrocarbons

EGPC has the right to acquire all crude oil produced from the Concession at the prevailing, international market price.

EGPC or EGAS also has the option (but not the obligation) to take all gas produced from the Concession for the domestic market. There is no agreement on gas price until commercial discovery. The full terms of a gas sales agreement are not included but the agreement will include a take or pay commitment by the offtaker.

Domestic sales to EGAS or EGPC (rather than other parties) are incentivised by tax relief. If the Contractor sells gas to EGAS, the Contractor's royalty and income tax obligations are paid on its behalf by EGAS. If the gas is sold to another party, the Contractor pays royalty and income tax itself and the costs are not recoverable. Exports of gas (or domestic sales other than to EGAS or EGPC) require government approval on price and quantities.

Operations

One of the Contractor parties is designated as the operator during exploration operations. After a commercial discovery, a private joint stock company incorporated in Egypt and owned 50/50 by the Contractor and EGPC conducts development and production operations. This is an uncommon (but not unique) structure. Joint venture operating companies are also seen in Iraq and Abu Dhabi, amongst other jurisdictions. The introduction of a joint venture operating company potentially adds an additional layer of bureaucracy, but Egypt has successfully conducted petroleum operations on this basis for many years.

Marketability of the asset

The restrictions on the Contractor parties transferring interests in the Concession are consistent with industry norms. Direct and indirect assignments of interests in the Concession are subject to government approval. EGPC has a pre-emption right on all assignments to non-affiliates of a Contractor member. An assignment bonus is payable by the relevant Contractor member and is not cost recoverable. On the positive side, transfers are free of any transfer, capital gains taxes or related taxes, charges or fees.

Governing law and dispute resolution

The Concession is governed by the laws of Egypt, although it is exempt from certain laws.

Disputes between the government and the Contractor are resolved by the Egyptian courts and disputes between EGPC and the Contractor are resolved by arbitration pursuant to the Arbitration

Egypt's concession model has been tried and tested over several years and proven itself fit for purpose

Rules of the Cairo Regional Center for International Commercial Arbitration. In general, foreign investors would prefer disputes to be resolved by international arbitration. There is no waiver of sovereign immunity by the government or EGPC.

In summary, Egypt's concession model has been tried and tested over several years and proven itself fit for purpose. The Concession would benefit from updating, but it remains to be seen if this will be on the government's agenda in the near future.

Availability of investment protections

Foreign investors benefit from several investment protection mechanisms in Egypt. Egypt is party to the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, which means that international arbitral awards from fellow member states should be automatically enforceable. Egypt is also party to several multilateral and bilateral investment treaties, including the 1965 Washington Convention on the Settlement of Investment Disputes between States and the nationals of other States (the ICSID **Convention**). As noted above though, disputes under concessions are not resolved by international arbitration but rather by domestic courts and domestic arbitration.

In 2017, Egyptian Law No. 72 of 2017 was enacted (the Investment Law). While the Investment Law is comprehensive and provides important protections to foreign investors, it is not likely that it will apply to a typical upstream project (unless such project is expressly designated as a project subject to the Investment Law).

The Gas Markets Law

The Gas Markets Law applies to gas shipping, transport, storage, distribution, supply, marketing and trading of all types and any works related thereto. The law aims to attract investment into the gas market, create competition and facilitate third party access to gas networks and facilities. It applies to domestic activities within Egypt and is intended to liberalise certain activities from state monopolies. The Gas Markets Law does not cover the export of gas.

Egypt has many advantages that could facilitate its establishment as a regional centre for energy trade

The Gas Markets Law establishes a new regulator: The Gas Market Regulatory Agency which reports to the Ministry of Petroleum. Entities that wish to carry out activities regulated by the law must be licensed.

Petroleum concession agreements are not subject to the Gas Markets Law. If the relevant government oil company exercises its option under a concession to take all gas for the domestic market, it seems that the Gas Markets Law should not apply. Other domestic gas sales, however, may require license.

In concept, the Gas Markets Law covers many of the same aspects addressed by laws liberalising the gas sector in EU jurisdictions. In time, the law may result in Contractors having greater opportunities to market their gas domestically, but it is still too early to evaluate its impact.

The future – a regional energy hub?

Egypt has many advantages that could facilitate its establishment as a regional centre for energy trade. A geographic location close to sources of gas demand and supply, existing LNG export infrastructure and governmental support for liberalising the gas market are all positive developments. Egypt is already seeking to take advantage of its position and signed an agreement with Cyprus in 2018 to construct a $1 billion undersea pipeline to link Cyprus' Aphrodite gas field to Egypt's LNG export plant.

Success, however, is not assured. To become a hub significant coordination with other countries will be required, and competing regional interests makes this a political challenge. For example, Turkey wishes to guard its position as a critical energy transit state for Europe and there are ongoing disputes regarding maritime boundaries and rights to offshore reserves in the East Mediterranean area.

In addition, at least one rival project is already under contemplation. On 2 January 2020, Greece, Cyprus, and Israel signed the EastMed Pipeline accord regarding the ambitious EastMed pipeline project. The project is being developed by IGI Poseidon S.A. (a joint venture between the Greek gas utility DEPA and the Italian gas utility Edison), and involves a gas pipeline directly from the Levantine Basin into Greece, where it would join with new pipelines from Greece to Bulgaria and from Greece to Italy. The project arguably competes with Egypt's LNG liquefaction plants in Damietta and Idku, although, if it worked, it would be an impressive model for regional cooperation and Egypt might be able to tie in its own pipeline.

In any case, given the scale and quality of recent gas discoveries and the world's transition to lower carbon fuels, gas reserves in Egypt are unlikely to be stranded. Gas production should help Egypt with its aims of energy independence and bolstering the domestic economy. Whilst there is always room to improve, the sector's resurgence demonstrates Egypt has struck the right balance: its concession terms are sufficient to attract foreign investment without giving too much value away.

Sources of information are available from the authors upon request

EGYPS EGYPT PETROLEUM SHOW

EGYPS 2020 Focus

Air Products looking to invest further in Egypt

Seifi Ghasemi, Chairman, President and CEO, Air Products spoke to Pipeline Magazine's **Julian Walker** about the growth opportunities in Egypt and the importance of hydrogen fuelling plants in the future

This is your first time speaking at EGYPS, can you tell us, how important is the Egyptian oil and gas sector for Air Products?

We at Air Products see ourselves at the heart of one of the greatest global challenges today: meeting the world's need for clean, sustainable energy... energy that protects our environment and moves us all towards a better future. We are driven to innovate alongside our customers and help make them more sustainable.

As the Egyptian oil and gas sector embarks on some of its Clean Fuels and Bottom of the Barrel projects, we are keen to leverage our investment appetite and technical expertise in the production and supply of industrial gases which are essential components for the success of these projects.

Generally speaking, there is tremendous growth potential across the oil and gas sector in Egypt and throughout the Middle East. As a global company, we are well positioned to support that growth, because our core competency at Air Products is our ability to develop, engineer, build, own and operate complex industrial gas facilities that transform the resources available to our customers into engines of economic growth and social development.

Air Products has earmarked the Middle East as a key global growth market. As such, Egypt being an important economy in the region, Air Products is keen to invest in the local economy in the next 3 to 5 years by supporting on-going downstream oil and gas projects.

What is the future for hydrogen fuelling plants looking like?

Our world needs a sustainable system to address environmental challenges while also meeting growing energy demand. Hydrogen and fuel cell technologies are well positioned to be part of the solution.

> Air Products has earmarked the Middle East as a key global growth market. Air Products is keen to invest in the local economy in the next 3 to 5 years by supporting on-going downstream oil and gas projects.

We have prioritised hydrogen for mobility and energy transition as a significant, sustainable growth area. Air Products is a leading global hydrogen provider, involved with 250+ fuelling projects in 20 countries. Our SmartFuel technologies fuel cars, trucks, vans, buses, forklifts, locomotives, planes, cell towers and material handling equipment. This past year, in partnership with Saudi Aramco, we launched the first-ever hydrogen fuelling station in the Middle East and look forward to building on that success.

Where do you see innovation and digitalisation creating possibilities for new technology advancements?

With respect to digitalisation, the innovative uses of data and digital technologies are fundamental to our long-term competitiveness. Within the Middle East, we continue to demonstrate our commitment to advancing digitalisation, recently establishing a new Process Intelligence Centre at our world-class Technology Centre in Saudi Arabia. The Process Intelligence Centre is the only location in the Middle East to provide mentored operations and dynamic simulations for operator training as well as other advanced technologies such as Industrial Internet of Things (IIOT), Digital Twin and high-performance computing for advanced modeling. Engineers in this center will be able to remotely monitor plants and equipment performance, allowing for quick diagnosis and enable real-time solutions.

Where are Air Products principle areas of expansion in the Middle East?

Air Products has had a presence in the Middle East for over 50 years, and a presence in Egypt since 2009 through our wholly owned Air Products Gases S.A.E, with an office in Cairo and production site in Sadat City. Over the years, we have become a trusted supplier for specialty gases to the refinery and chemical industries and have provided several equipment solutions to Egyptian companies.

Over the last decade, we have made several investments in our merchant gases business, and recently, we have grown through large projects and initiatives: completing the world's largest ASU complex at Jazan, Saudi Arabia; announcing plans to form an integrated gasification combined cycle (IGCC) joint venture at Jazan; building our core competencies in the region through our world-class technology center in the Dhahran Techno Valley; and signing an MoU between the Royal Commission for Jubail and Yanbu and Air Products Qudra to establish world-class industrial gas production facilities and distribution networks.

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EGYPS EGYPT PETROLEUM SHOW

EGYPS 2020 Focus

Wintershall Dea in Egypt: long tradition, bright future

By: Sameh Sabry, Managing Director, Egypt, Wintershall Dea

The start of a new year is always a time to reflect on past achievements and on goals for the future. The start of a new decade, even more so. So, as we gear up for the first EGYPS of the 2020s, it's appropriate to take stock of the outlook for the sector in Egypt, and for Wintershall Dea.

Wintershall Dea itself is still a new company, formed in 2019 from the merger of Wintershall and DEA, two companies with a long tradition of German engineering and E&P excellence. So, we are a young company, with a long heritage behind us.

And that heritage includes over 40 years of being active in Egypt. Since the 1980s we've produced gas and oil in stable and effective partnership with EGAS and the Egyptian General Petroleum Corporation. Today, we are producing gas and oil from brownfields in the Gulf of Suez, gas at Disouq in the onshore Nile Delta, and gas from the offshore West Nile Delta project, with our partner and operator BP.

And in the last three years we have actively increased efforts in our Egyptian assets with the goal of boosting local production. That hard work is yielding results. For our mature assets in the Gulf of Suez, for example, we've conducted technical workovers on existing wells and pipelines, and invested in maintaining asset integrity. These measures have achieved our targeted rise in production, while also improving safety and contributing to overall asset life.

Economic reforms and the Egyptian oil and gas sector's modernisation programme are paying off

So, Egypt plays an important role within Wintershall Dea's global portfolio, today and in the future. But our investment is only possible because of the significantly improved business environment in the country. As a proud Egyptian myself, I've seen first-hand how the sector and investment conditions here have improved in recent years, to the point where Egypt can credibly claim to be forging a new future at the heart of an East Mediterranean Gas Hub.

Important steps have been taken to build investor confidence. Ambitious economic reform, and a modernisation programme for the sector overall have given a clear signal to the world. That Egypt welcomes international investment and is serious about building an effective and attractive environment to operate in.

It's also promising that the Ministry of Petroleum, the state companies, and all industry parties have shown a desire to work effectively together. One example is improving brownfield performance. While major new discoveries are driving the excitement around Egypt's energy sector at the moment, extracting maximum value from mature assets is just as important. In particular, as the majority of Egypt's crude oil production is produced from mature brownfields. So, a joint industry project, run in support of the Ministry of Petroleum's modernisation programme, has been looking at improving brownfield performance. This sharing of ideas and experience is a reassuring sign of cooperation and a maturing sector in Egypt.

An East Mediterranean Hub with a bright future

Having been a net importer of gas just a few years ago, Egypt can face the 2020s with confidence and excitement. Discoveries of recent years and subsequent production, such as in the West Nile Delta Project, put the country in an excellent position. So, it's no coincidence that Egypt is progressing towards becoming an East Mediterranean Energy Hub. Egypt has of course a number of important factors that make it ideal as a hub; including its ideal geographical position and strong infrastructure, including the Suez-Mediterranean Pipeline and its LNG export terminals.

At Wintershall Dea we fully support Egypt's efforts to create a hub. We intend to actively contribute to its development, and we are pleased to now be a member of the East Med Gas Forum's Advisory Committee.

Set on growth

And while we continue to invest in our existing assets, we will also look into further opportunities in Egypt. That's in line with our global ambition for growth. Wintershall Dea currently produces around 590,000 barrels of oil equivalent per day. And we intend to increase that to up to 750,000 barrels by 2023. We'll do so primarily by finding new opportunities in our core regions, of which Egypt is one.

It can be hard to accurately forecast the future in the energy industry. But what we can say, looking ahead, is that all the key ingredients for a successful future in Egypt are there-undeveloped resources, an improving business environment, driven by a modernising, liberalising regulatory regime, an unrivalled geographical location supported by effective infrastructure and an experienced, skilled industry. Those of us involved in building this future have a shared responsibility to grasp this opportunity. Wintershall Dea will play its part.

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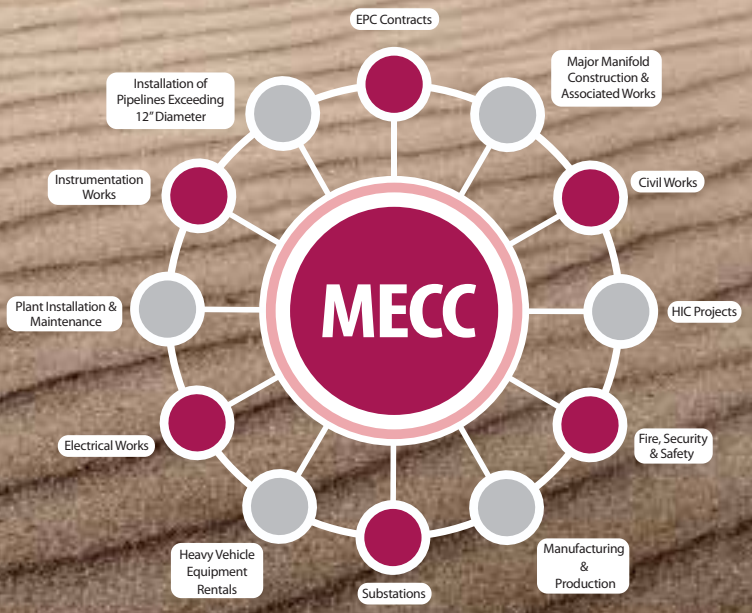

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EGYPS EGYPT PETROLEUM SHOW

EGYPS 2020 Focus

Energean looking at a bright sustainable future in the Mediterranean

Mathios Rigas, Energean's Chief Executive Officer, speaks to Pipeline Magazine's **Julian Walker** about the company's commitment to Egypt and the Edison E&P acquisition

How important is the Egyptian market to Energean's growth strategy?

Energean's vision is to become the leading independent E&P company in the Mediterranean, so Egypt has always been a key country for us. We are strongly committed to Egypt, we started operating in the country in 2010, and we have drilled exploration wells in areas such as West Kom Ombo and East Magawish. Even though this activity did not result in a discovery, it helped us understand further the geology, made us familiar with the particularities of the country, and helped as build a fruitful relationship with Egypt's authorities.

How did buying Edison change your position in Egypt?

Assuming the completion of the acquisition of Edison E&P, Egypt's portfolio will bring to Energean a significant amount of daily production as well as a very important commercial agreement with EGPC, which buys the gas produced from the Abu Qir field. Abu Qir is one of Egypt's biggest producing assets and also will contribute substantially to Energean's plans to reduce its environmental footprint and positively participate in the energy transition. Energean started as a 100 per cent oil producer and, inclusive of the acquisition of the Edison E&P assets, it has now evolved as an E&P company with 80 per cent of its reserves and production from natural gas. Indeed, our commitment to the environment was underlined by Energean being one of the first E&P companies to commit to become a net zero emitter by 2050 and to run a very ambitious but realistic plan to reduce our net CO2 emissions by more than 70 per cent in just three years from now.

What are the main opportunities (offshore or onshore) do you see in Egypt since you agreed to buy Edison?

Apart from Abu Qir, the NEA concession will be a 100 per cent owned and operated gas and condensate field located offshore of the Western Nile Delta in Egypt and next to Abu Qir. The asset's two fields Python and Yazzi are expected to be developed across, and produced through, the existing Abu Qir gas infrastructure, generating significant synergies and cost savings versus a standalone development. Beyond these two fields, there is further upside from the North Idku development, which is located adjacent to NEA and is expected to be tied-back to NEA infrastructure. In addition, there is exploration gas potential in North Thekah via an extension of the Tamar sand play into Egypt. Energean is also evaluating any other investing opportunities the country offers, always applying the company's core principles: ESG Stewardship – Risk Mitigation – Operational Excellence – Effective Project Execution – Disciplined Capital Allocation

How important are gas and LNG to the future of the world's energy mix?

The transition to a renewable energy world will take some decades. The basic scenarios of all organisations regarding primary energy consumption in the next couple of decades conclude that renewable energy is the fastest growing source of energy, accounting for around half of the increase in energy and that natural gas grows much faster than either oil or coal. So, gas will be the main fossil fuel that will lead the energy transition era towards an ideal of a 100 per cent renewable consuming planet. Following Zohr and the discoveries in Israel and Cyprus, the East Mediterranean has emerged as the next big thing in gas but what I would like to emphasise here is the importance of the infrastructure needed to transport gas from the producing assets to consumers. Egypt is already playing a major role as a gas hub due to infrastructure such as the LNG terminals in the Med. Energean is building its own infrastructure, namely the 'Energean Power' which will be the first FPSO ever to operate in the East Mediterranean aiming at supplying the markets of the region with gas with a capacity of 8BCM per year. Energean is also active in the EastMed Pipeline Project which aims at supplying Europe from the region's gas fields, starting from the development of the Karish field which will come on stream in 2021.

How are you supporting EGYPS this year?

We are silver sponsors and exhibitors. We consider EGYPS as a landmark event that is crucial in promoting industry cooperation and this is why, apart from myself, several of Energean's top level officials and members of the Technical Team are participating in panel discussions. So, we are looking forward to meeting you at our booth to introduce you further to Energean's strategy for the sustainable development of the natural resources in the Mediterranean.

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EGYPS EGYPT PETROLEUM SHOW

EGYPS 2020 Focus

Egypt's offshore prospects are even greater with the right technologies

By: Siva Krishnan, Head of Siemens Oil & Gas in the Middle East and North Africa

Egypt is on the verge of transitioning from a net importer of gas into a regional gas hub, thanks to massive offshore discoveries in the Eastern Mediterranean. But abundance is only part of the equation – Egypt's golden gas age hinges on the technology it selects that will optimise production while minimising the environmental impact.

The Arab world's most populous country has enjoyed political stability and an economic revival in recent years which has spurred investments, especially in the energy industry. This optimism is a reversal of several years of rising domestic gas consumption and dwindling production that forced the temporary closure of Egypt's two liquefied natural gas export facilities and all but halted investment in the sector.

A major find in 2015, about 200km off Egypt's coast in the Eastern Mediterranean, was the turning point. The giant offshore Zohr field, with an estimated 30 trillion cubic feet of natural gas reserves, has transformed Egypt's prospects, provided the country additional clout in the energy market and presented opportunities for further offshore development.

Egypt's natural gas reserves doubled in the past two decades to 2.1 trillion cubic meters, according to the latest BP Statistical Review of World Energy.

> With Egypt's recent track record of building some of the world's most-efficient power plants, it's clear that its energy industry is serious about reducing fuel and lifecycle costs and cutting emissions.

Gas output grew at the second-fastest rate in the world in 2018, and with new concessions awarded and continued exploration activity, most forecasts predict significant increases in both production and reserves.

The technology needed to extract gas from under the Mediterranean, process and transport it, is well established. But given the constraints that "lower for longer" oil and gas price forecasts have on energy companies, and the urgent need to tackle the challenges of climate change and massively reduce CO2 and other emissions, the industry is increasingly turning to technology that lowers lifecycle costs, optimises output and protects the planet.

Offshore oil and gas developers are taking advantage of technological advances and going for deeper and more complex fields, whether it's by platforms or floating production storage and offloading (FPSO) vessels. This has

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presented many technical challenges with regards to topsides development, which has become more complex in recent years. Equipment must be small and light, but still robust enough to meet project requirements for processing, production, transportation, serviceability and reliability.

Siemens has taken strategic steps to help the industry overcome these challenges by developing power and compression solutions that conserve weight and space, while providing the necessary power to exploit deep-water reserves.

A recent project in the Barents Sea included a 41 MW Siemens SGT-750 gas turbine that drives two high-efficiency Siemens DATUM compressors operating in a tandem arrangement. The turbine features a unique design that eliminates the need for a speed-increasing gearbox, which reduces the weight and footprint of the package. It has extended maintenance intervals – designed for 17 days in 17 years – ensuring production uptime and profitability, and lowering operating expense as well.

In the Eastern Mediterranean, we will supply the full electrical scope, together with four Siemens SGT-400 gas turbines, waste heat recovery units, a flash gas compressor, and two sales gas compressors for an FPSO that's expected to be commissioned next year. The equipment will produce both electricity and heat to extract and process the production at sea, as well as export the gas to shore.

Unique to this FPSO is the first ever full-scale deployment of Topsides 4.0, which is Siemens' holistic digital lifecycle approach to rotating equipment and electrical and automation systems.

Topsides 4.0 begins during the conceptual and design phase of a project. The approach reduces capital and operating expenses, shortens project development cycles, minimises interfacing risk and decreases offshore manpower requirements. This is achieved by digital project management and manufacturing, virtual testing and commissioning, and delivery of an intelligent "digital twin" of the facility, which can be used by operators for lifecycle decision-making and asset optimisation.

With the digital twin, engineers have continuous access to as-is asset data and can plan maintenance campaigns based on condition monitoring analytics. An integrated control and safety system solution is designed for remote control and monitoring, which improves safety and reduces costs by shifting labour resources from offshore to onshore. Combined, these benefits can reduce operating expenditures by 10 per cent to 15 per cent each year.

Siemens has a long track record in Egypt and has participated in one of the country's most transformative projects. Along with our partners, we built three of the world's biggest gas-fired, combined cycle power plants, delivering an additional 14.4 gigawatts to the electric grid in just 27.5 months. The H-class turbines at Beni Suef, Burullus and New Capital are among the world's most efficient, contributing to $1 billion a year in fuel savings and a significant reduction in CO2 emissions.

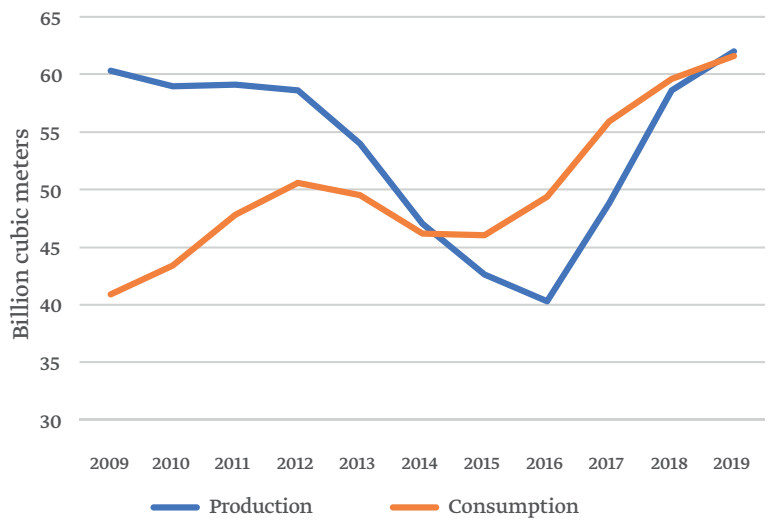
Siemens also has a role in Egypt's offshore developments. The company supplied six model SGT-400 industrial gas turbines and associated electrical generators to Petrobel, the joint venture between Italy's Eni and Egypt's General Petroleum, which is developing the Zohr field. This turbine-generator system provides about 20 per cent more power than comparable equipment.

Egypt isn't limiting its potential to the Zohr windfall. Further development of Eastern Mediterranean gas is underway, and a pipeline network linking supplies from Israel and potentially Cyprus can convert the fuel into LNG for export at the Idku and Damietta plants. This cross-border economic cooperation has been formalised in a new organization, the Eastern Mediterranean Gas Forum, which will be based in Cairo and currently comprises Egypt, Cyprus, Greece, Israel, Italy and Jordan.

The prospects in the Eastern Mediterranean are undeniable. With Egypt's recent track record of building some of the world's most-efficient power plants, it's clear that its energy industry is serious about reducing fuel and lifecycle costs and cutting emissions. Siemens portfolio is well suited to the task of helping Egypt improve the overall economics and environmental footprint of its offshore natural gas industry, and ultimately, enter its golden gas age.

Room for Exports

Major gas finds help Egypt eliminate its need for imports



Source: BP Statistical Review of World Energy 2019, Egyptian Natural Gas Holding Company

Note: 2019 data is for fiscal year ended June 30

EGYPS EGYPT PETROLEUM SHOW

EGYPS 2020 Focus

High performance production solutions for modern motor gasoline

By: SIE Neftehim

SIE Neftehim (Russia) will present its isomerisation and reforming technologies at EGYPS-2020 for the first time.

SIE Neftehim is the well-known Russian engineering company, Licensor and producer of refining catalysts and technologies.

For over 60 years, SIE Neftehim technologies have been firmly consolidated in the world market.

Currently, the company takes a special interest in the North African and Mediterranean market. Delivering the energy needs of tomorrow, introducing the best innovative environmental and economically efficient solutions, renovating the existing production facilities, increasing the production share of gasoline meeting the modern environmental standards are the main activities of SIE Neftehim.

SIE Neftehim has its own scientific and laboratory base, modern equipment, expertise and knowledge for constant enhancement of catalyst quality and the new effective solutions.

Today, SIE Neftehim has widely introduced Isomalk-2 isomerisation technology based on the unique oxide catalyst SI-2, which helps to produce high-octane gasoline component without chlorinating reagents, while SI-2 catalyst service life is more than 12 years.

Over a half of Russian gasoline is produced with Isomalk-2 technology.

Other new products and those acknowledged in the market that will be presented at EGYPS-2020:

- n-butane to isobutane isomerization technology and catalyst, isobutane is used to produce alkylate and MTBE;
- ISOPLAT technology, combining 2 processes: heptane isomerisation and naphtha reforming;
- naphtha reforming catalysts for continuous regeneration, as well as semi-regenerative reformers;
- isobutane and isopentane reverse isomerisation technologies to produce monomers in petrochemical synthesis.

SIE Neftehim technologies and catalysts are patented in many countries and have multiples awards.

> SIE Neftehim has its own scientific and laboratory base, modern equipment, expertise and knowledge for constant enhancement of catalyst quality and the new effective solutions

Within EGYPS Technical Conference 2020, SIE Neftehim Chief Technology Officer Timofey Karpenko will deliver his report "Modern isomerisation and reforming technologies for enhancement of quality and yield of Euro-5 compliant motor gasoline".

SIE Neftehim, LLC is:

- the reliable supplier of unique technologies and catalysts for isomerisation, reforming, hydrotreatment, and hydrogenation;
- comprehensive solutions minimizing involvement of additional expensive non-aromatic fuel components for production of EURO-5 gasoline and increasing commercial product yield;
- simple and technically reliable solutions minimising CAPEX and OPEX;
- technical support from proven process developer at all project stages.

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Drexel Egypt looking to expand its presence in Egypt

Drexel Vice President Eng. Ahmed Shalash speaks to Pipeline Magazine about the importance of Egypt for it and how the company is looking to evolve to meet the challenges of a new energy landscape

How important is Egypt to your growth strategy?

A growth strategy usually starts by identifying and accessing opportunities within the market. Egypt has become one of the very high potential countries in the Middle East. Our growth strategy is based on how Drexel is going to evolve to meet the challenges of today and in the future, to ensure keeping us working towards goals that go beyond what's happening in the market today. We keep shareholders leaders and employees focused and aligned, to make decisions not based on today, but for an emerging tomorrow. This growth strategy is being carried out by continuous coordination among a cross-functional group of stakeholders in the Egypt market.

Drexel has been building partners with Egyptian customers and delivering a distinctive and integrated customer experience.

What areas are you focusing on in Egypt?

We are focusing on new oil and gas projects and expansions, in addition to petrochemicals and fertilisers.

A well-trained workforce, advanced equipment, and state of the art facilities earned Drexel Oilfield our solid reputation delivering client- focused services for multi nationals in the business.

Are you looking to expand your business in Egypt?

Yes... as previously mentioned, Egypt is booming and becoming the oil and gas hub in the region. This encourages us to increase our investment in assets and personnel to serve the local market with the best up to date services and technologies.

How has the business landscape changed in Egypt over the last few years?

The business landscape for Drexel has changed over the last few years from only acting as principals to major reputable companies, to being a very specialised service provider. We have established downstream and upstream business units, in addition to safety and specialised supplies units.

In a nutshell, we go where the business is. So we have diverted from only serving production companies, now we cover refineries, petrochemicals, gas, fertilisers and even new industrial construction projects.

What is your outlook for Egypt's oil and gas industry?

We are serving both organically and inorganic, we are developing the business within each of our companies.

We're growing the upstream and the downstream businesses. Within upstream, we are currently pushing through our safety division within Drexel, which provides safety service to around 30 per cent of the market in Egypt. At the same time we are looking into new accusations.

Within downstream, we are also working very hard, not just for oil and gas companies, but also by providing services to petrochemicals and fertilizers companies. We're aiming to be one of the top safety providers in training, PPE (Personal Protective Equipment), H2S, drilling operations and so on. We're providing these services across the whole industry, not just for oil and gas.

> Drexel has been building partners with Egyptian customers and delivering a distinctive and integrated customer experience.

Do you see an opportunity in Egypt's downstream sector?

We have invested in our downstream business unit to ensure we are covering the full integrated services. This covers catalyst handling services, PPS services, and specialised mechanical services in addition to specialised safety solutions.

Our portfolio covers services required during pre-commissioning of new projects and also specialised services during shutdowns and turnarounds.

We have invested in new up to date nitrogen pumping units, vaporizers, tanks, flange management and hot tapping equipment in addition to leak sealing services. We have also invested in our safety related services equipment and gas monitoring tools.

Our eyes are focused on working with new refining and petrochemical companies for new upgrading projects; we worked at Zohr Project in the downstream part of the gas plant.

We have just successfully completed works with Methanex Shutdown, completing catalyst change out scope, mechanical works and heat exchangers hydro jetting works. Also, we completed a new catalyst loading for GS/ERC refining and BP West Nile Delta Giza Fayoum and Raven plants including the full safety service for all the activities. This is in addition to nitrogen purging service to GUPCO Shutdowns and Sokhna NCIC Second Ammonia Tank.

Fincantieri sees Egypt as a key market as it pushes its steam turbines

Egypt is a key country for Fincantieri, having a relevant installed base in several industries and a positive outlook about new business opportunities

Fincantieri is present in Egypt with its own agent and is currently engaged in several RFQs.

Fincantieri steam turbines combine long experience, state-of-the-art technology and the continuous feed-back of worldwide customers for constant improvement.

Extensive and continuous research activity lead to high efficiency, reliability and quality of the final product.

Steam turbines cover the whole range from 200 kW up to 50 MW, and are suitable for all the industrial applications, including in the oil and gas industry. The design concept is modular, customised to the smallest detail according to the customers' needs and requirements. Production range includes multi/single-stage and multi-valve backpressure or condensing types with or without controlled/uncontrolled steam extractions. Fincantieri steam turbines and relevant auxiliaries can be supplied according to API codes.

Fincantieri provides installation and service activities for steam turbines, including the assembly of the plant, the commissioning, the test running, and the training for operators.

In addition, the customer can plan and organise the maintenance and overhauling activities in co-ordination with the company's service department. Several skilled service teams - available around-the-clock - ensure professional assistance by managing and solving any kind of problems and/or by performing the operations relevant to the machinery. Fincantieri can provide different levels of maintenance programmes based on the customers' needs, starting from traditional approaches, through predictive and preventive periodical operations, up to permanent on site monitoring carried out by the firm's field service engineers and remote parameters diagnosis. This kind of operation aims at improving steam turbine availability as well as keeping and optimising the turbine efficiency.

Fincantieri is present on the energy market as Steam Turbines OEM (Original Equipment Manufacturer), as well as EPC (Engineering, Procurement and Construction) for the power plant or part of it.

Egypt Growth

During the last few years, the country's situation has improved significantly and Egypt has an interesting window for accessing new markets and new customers. In this sense, cooperation with companies like Triplefast are crucial for the development of business initiatives in Egypt, including localisation of products production.

Fincantieri expects to get in touch with companies, consultants and organisations willing to share its vision about Egypt. Fincantieri feels that Egypt will play an important role not only for its turbine division but also for other divisions in the future.

In the future Fincantieri intends to become more engaged in turnkey offering, as it has the engineering and financial capability to become the only partners providing not only steam turbines, but also complete plants.

Fincantieri aims to move from being a product to a solution provider. This is why Egypt is so important for the Group and why the country could play an important role in its growth strategy.

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ABB integrates solutions amid an energy industry transition

ABB Energy Industries' India, Middle East & Africa senior vice president – hub manager **Christian Cravedi** and vice president, hub business line digital manager **Ronan O'Sullivan** speak to Pipeline Magazine's Nadia Saleem about strategies that are supporting the energy world's shift towards a sustainable, digital future

How is ABB supporting a step change in the development and delivery of the global energy system?

Cravedi: Our approach is through a strong value chain with a value proposition, which is digital as well as sustainable.

We are very much focused on the technology part of the full chain with the latest solutions and services across the chain. At ABB, we are in front of the challenge of integrating all these different technologies into a single platform to be digitally enabled. As we enter a digital environment, we focus on the 3S - to be much safer, smarter in our solutions, and more sustainable.

Our sustainable solutions are very much driven by the digital value proposition and long-term partnerships.

Usually, sustainability is about the environment, but when we talk about this region, we enter discussions about in-country-value (ICV) development.

The ICV sustainability process means to supply as much as we can from the country for the country and making sustainable the national's employment.

Through the value chain of ABB, which is very much focused on long-term partnership, ABB has a different approach compared to that of a typical technology provider. Whatever we do in terms of adding value, it is to make it sustainable. When EPC developers come in, develop and move on to the next job - this doesn't create sustainable Emiratisation environment.

O'Sullivan: As we transition into a digital perspective on how we are addressing sustainability globally: it is driven by necessity from the customer first and foremost. This poses the question of how can we extend the lifecycle of their existing equipment and what we can do from a digital prescriptive and enhance how their equipment is running.

We're really applying newer technology now in order to have the whole value chain from supply to demand as well as long-term sustainability as well as reliability. This is how we see digital fitting into our energy industry, which is oil, gas, chemical, power and water.

What strategy do you use to capture regional growth and secure your position in the years ahead?

Cravedi: ABB always has a global strategy but there is also a local strategy - ABB is a global company, acting very much into a local environment. This is the reason why we have been in the UAE for 30 years, acting locally.

In the UAE, where ADNOC wants to drive the market, this is aligned with ABB's value proposition as well as the execution model. We are very much about digital - doing more with less but doing it even better and more sustainably.

Being local is extremely embedded into our DNA and localisation is what markets in this region are asking for. The demands of the market have been matching our value proposition and our execution, because that is how we established our business here. ICV for us doesn't generate new contribution but a confirmation that our model is fit for this.

How is the energy transition and digital transformation playing out for ABB?

Cravedi: ABB is always a moving company and we are readjusting and tuning our organisation to support the market demand.

We created a new business line 10 years ago called Energy Industries – this is matching the current demand in terms of the energy revolution within oil, gas, chemicals, power and water.

We are going to move into something more sustainable in terms of energy, which doesn't mean there will be no hydrocarbon but it's going to be much more fluid energy with an integration between oil, gas, and power sector. This is going to be a full chain of value, and ABB has had that approach from the very beginning.

Historically, ABB was a pioneer in technology, but also in seeing how the trend of the market is going in order to be aligned with it.

Our customers are basically stretching their own value chain, we've seen this in Saudi Arabia, where from a typical refinery, the project plans evolved into a multi-product refining complex. So all the flexibility of logistics has to be built in so your resources are utilised in the best way.

Today, we can fully showcase the ABB-enabled solutions in Sadara, the biggest petrochemical complex ever built in one single shot. The next step is to make it digital.

O'Sullivan: From a technology standpoint, we've been pioneers and innovators of technology for many centuries now. Where we're focused now is on supporting companies that were traditionally oil and gas but are now becoming energy companies and even buyers of electricity.

With the growth of solar and wind in the mix of renewable energy into the whole value chain, we look at how we take our technology and give visibility over that entire value chain of supply and demand.

> At ABB, we are in front of the challenge of integrating all these different technologies into a single platform to be digitally enabled
>
> **Cravedi**

As the energy mix grows, we will be able to supply the right technology right when it's needed. We're currently having small pilots of these technologies.

Because companies are evolving in their energy sources as well, this is what we're seeing as our new ABB ability, which is our overall platform, our hardware and software connectivity. So when the time comes for this added connectivity source, we will be ready to service our customers.

You briefly mentioned Sadara – can you also speak about your new model where solutions are integrated and how this plays a role in the shift towards digitalisation?

O'Sullivan: What we find is demand from our customers around five pillars. Safety and cyber security is the primary and most focused on pillar of all – this is where we have developed solutions that take into account the overall safety of the facility as well as multiple facilities from a human safety aspect as well as asset safety.

Then we move into sustainability and reliability, where asset performance management comes into play. There is a big demand from the market and all of our users on how to extend the lifecycle on all existing equipment and how to reduce cost from unplanned shutdowns for example.

This is being able to provide them technology which gives insight into their equipment, plan for the right outages as well as suggest the right repair measures around types of equipment.

Energy management is another big pillar for us. Now that there is renewable energy coming into the mix of traditional energy markets we look at how we can manage the supply and demand from an energy perspective.

Then we get into simulation and digital twin as another pillar. This is really enabling knowledge from the retiring workforce into the new workforce. There was a major gap for engineering students wanting to go down that path, which is being bridged by the transferring of knowledge and training through the digital twin and simulation.

Lastly, we have operational management, where we giving insight into how companies are running their operations and connecting IT with OT environment, being able to integrate the running facilities as well as any type of demand coming in from ERP systems, being able to generate KPI and looking at ways to optimise their entire processes – not only on running facilities but also how they are managing supply and demand to their customers, so as to try and give them an advantage with our technology.

Weatherford runs pilot for developing technology of the future

John Clegg, Fellow at Weatherford speaks to Pipeline Magazine's **Nadia Saleem** about how the company developed its latest rotary steering systems based on customer requirements that will also serve as a basis of future technology development

Weatherford is a technology company, which develops tools for drilling and completions in the oil and gas industry. The company last year won a three-year directional drilling services contract from Abu Dhabi Company for Offshore Petroleum Operations (ADNOC Offshore) to increase offshore production using the Weatherford Magnus rotary steerable system.

"The recent directional drilling contract cements our position here as a key directional drilling services supplier to ADNOC going forward," said John Clegg. "One of the things that helped us win this is that we changed the way we look at technology development."

Clegg has been working in the industry for 33 years and was involved in the early development of rotary steering technology in the early 1990s. At that time, this was a very niche market with very high technology costs that resulted in very costly wells, he said.

"In the interim of 25 years, everything has changed - it's now fairly mainstream. The performance of rotary steerable is now a given and it's not much more about economics."

"We recognised that rotary steering tools were historically quite costly to operate, which means in a market where oil price is lower and everybody has a lot of pressure to reduce cost and pressure, it would be very difficult to take rotary equipment and make it ubiquitous," he added.

Magnus development

Weatherford began developing its Magnus rotary steering in the spring of 2016, where it decided to adopt a very different approach.

"We talked to a number of our customers about their technical requirements - because requirements for rotary systems have changed over the last years. We were able to put together some technical requirements that were not available in other systems on the market.

> There was a big opportunity to significantly improve the utilisation of assets and by doing that, it's a good way of improving the economics of rotary steering systems and making it more applicable in more markets.

But we also looked at it from an economic perspective and we determined that it needs to be reliable, cost effective and one of the critical things we looked at was asset utilisation and ease of repair," Clegg said.

Typically, rotary steering systems have been fairly complex in nature, so if a repairing need arose, the equipment would

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need to be taken to a central repair centre for repairs and tests that would require logistic issues.

For this region, Weatherford's centre is in Abu Dhabi, which could mean shipping rotary tools to different countries, waiting around for boats or putting them on expensive airplanes and being moved to different locations for repairs.

Lengthy logistics and repairs means that during operations, when the tool is not being used, the operator is losing money.

"There was a big opportunity to significantly improve the utilisation of assets and by doing that, it's a good way of improving the economics of rotary steering systems and making it more applicable in more markets. Importantly, for the Middle East, that also means you can do a lot more work locally," Clegg said.

Weatherford designed the tools in a way that instead of needing a big repair base with specialised testing equipment, it could be taken to any workshop with an overhead crane and a breakout machine and a tool chest with common hand tools.

"We've actually been able to repair the equipment at a rig site in three hours. That way, any location in any country that we operate in, you can repair the equipment within a few miles of the rig site and therefore improve its utilisation rate and also create the opportunity for local content in terms of repairing locally, using local labour and also having a local supply chain when it comes to spare parts," he said.

With this model, everything fit in well especially for this region, fulfilling requirements such as In-Country Value generation, flexibility in repairs, lower cost and higher utilisation, he said.

"By clarifying what the tool should do and also what it shouldn't do, we were able to simplify the technology and de-risk the project. Rotary steering is becoming more commoditised as it becomes simplified but we have to embrace that this is the route the industry is going towards, rather than resist it. We need to recognise that and develop and use tools that are simpler to work with. Although, because of the technology the tool needs, there is still a barrier to entry for competition. But we can't create artificial barriers - we need to recognise our customers' requirements and work with those," Clegg said.

The link between the development of the tool and the successful commercial application meanwhile, is also significant.

Weatherford developed a prototype in 11 months and one question that arose was about risk, because when you develop something so fast, you don't know it's going to work.

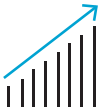
To address that, the company rented a rig site in Oklahoma, U.S., for one week per month for a year to test the tool.

Over the course of the year, it made sure the tool failed as soon as possible so the failures could be fixed and the tool de-risked. Eventually, the company spent more time in testing than in design.

Clegg sees this approach flowing over to other future technology developments as well.

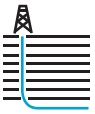
"The philosophies that we have lined in terms of minimum specification, understanding fully what the customer requirements are, which helps you to drive that minimum specification and then rapid development and designing for economic use and utilisation - that's something you will see in all of our drilling technologies going forward," he said, adding that this approach reflects that the world we live in now is very different that the world we lived in when these technologies were introduced.

Magnus Rotary Steerable System



Cumulative footage drilled:
>500,000 ft

Number of runs:
Over 200 wells



Highest dogleg in a commercial application:
9.89° /100ft

Longest single run lateral:
12,482 ft

With fully independent control of three steering pads near the bit, Weatherford's Magnus RSS is designed for a broad scope of modern directional demands

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Thru-tubing sand remediation benefits from single-trip system

By: Eilidh McKay, technical support manager at Tendeka

The control and management of sand issues is an inherent problem in the oil and gas industry whereby effective solutions have been extremely limited due to high cost or poor performance. The failure to address sand ingress in an existing completion can have a significant impact on productivity, well life, completion equipment life, and safety through the erosion of surface equipment. Notwithstanding the huge environmental and financial impact of disposing of large quantities of sand.

The conventional process of thru-tubing sand control can be costly and time consuming, in many cases there is a requirement to remove sand from the wellbore prior to installing the chosen sand control solution. Once installed, many traditional remediation techniques still allow the wellbore to refill with formation sand, yet again reducing productivity and increasing susceptibility to erosional failure.

The major challenge is to regain sand control in existing completions and prevent sand from filling the wellbore, without the requirement to perform a costly workover or complex thru-tubing gravel packs.

The smart saviour of sand control

Tendeka, a global specialist in advanced completions, production solutions and sand control has developed Filtrex, a new cost-effective, single trip, thru-tubing sand control solution. This has the potential to significantly improve the financial feasibility of restoring production to failed wells.

In addition to eliminating the need to perform a full workover, intervention timings can be cut in half and associated run charges reduced by at least 50 per cent. It is the first time a technology of this kind has been able to perform sand clean out during deployment, preventing multiple intervention trips.

The power of polymer

The key to the success of Filtrex is the use of an open cell matrix polymer filter which can be deployed downhole where it is compressed

within the running tool and compression sleeve. It can be installed in a live well, thru-tubing, and through tight nipple restrictions, whilst offering full compliance to the damaged section once set. The high compressibility of the material means the assembly can pass through tubing restrictions and expand into the larger casing/liner configurations.

When deployed on coiled tubing, installation is performed over three stages.

First, as it can be deployed in a live well this enables sand clean-out and chemical treatments to be performed as a single trip process. Upon reaching the zone of interest, integral jetting nozzles are activated to start sand clean up.

Once this is complete, a ball is dropped, and pressure applied to activate the high expansion anchor deployed below the Filtrex screen.

Once set, the running tool and compression sleeve removal enables the polymer filter to expand and conform to the ID of the casing or failed screen. The filling of the annular gap prevents further ingress of reservoir solids into the wellbore whilst still allowing passage of liquids or gases.

Finally, the running tool and compression sleeve is then retrieved from the well.

The length can be modified to suit the application and lubricator length restriction. If longer lengths are required these can simply be stacked on top of the previous screen section.

Flexibility and reliability

The Filtrex open cell matrix polymer encases a length of solid perforated tubing providing mechanical strength and a flow conduit from producing zones below. The multilayer system ensures full expansion in the damaged screen section or casing and effective flow divergence regaining sand control in existing completions.

The design of the system, derived from scrum/sprint development processes, allows the combination of many distinct layers with a range of cell sizes and allow comingled production from zones above and below the tool. This ensures the design has the flexibility to size the screen for each application and safeguard the appropriate retention of sand in standard well environments up to 110˚C.

As a retrievable thru-tubing system, it is easily deployable by conventional coiled tubing through 4-1/2" completions and self-centralises once expanded in deviations up to 90˚. This initial configuration is the only product of its kind that can be run through a 3.688" nipple and set in a 7" casing/liner.

Sand control innovation

Filtrex is currently being evaluated against multiple applications to develop robust understanding of the system's operating envelop and selection criteria. The company has recently invested in a dedicated sand control laboratory at its Aberdeen, UK headquarters, to support this. The facility remit is to continue developing effective and economical solutions to better manage and control a wide range of sand problems.

Currently, there is engagement with several operators who are developing bespoke testing programs to qualify the device for specific assets. Beyond the current design, further sizes are currently under development. Combined with other technologies and services, Tendeka can provide expanded functionality to include inflow control, cross flow prevention, water shut-off and zonal isolation.

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Energy sector a prime target for cyber attacks

Ashraf Koheil, regional director, MEA – FireEye talked to Pipeline Magazine about the type of cyberattacks the energy sector can face and what companies should look to do

What is FireEye's cyber security strategy going forward?

At FireEye, our mission is to relentlessly protect our customers with the technology and expertise acquired from being on the frontlines of cyber attacks. We know technology alone is not enough to combat the current threat landscape, so we deliver a complete suite of detection, protection, response capabilities and intelligence consulting to protect organisations against the most advanced threats.

What are your customers' top priorities when it comes to cyber security?

Our customers look to us to ensure they are protected against cyber attacks from every angle. With FireEye staff spending more than 1 million hours per year on the front line of attacks, customers trust and depend on our real-time knowledge of the threat landscape. They look for partners that can deliver not only on technology, but the context and threat intelligence to back it up.

How are cyber security attacks on the oil and gas sector evolving?

The oil and gas industry is a prime target for all types of cyber attacks. Nation-state actors, rogue terrorists, criminals and hacktivists have varying motives, including sabotage, espionage, financial gain, or political causes.

The energy industry will likely continue to be a high priority target, particularly given its importance to national and economic security. We expect the following situations may further contribute to threat activity towards the industry:

- The continued drop in oil prices may influence cyber criminals to attack pilfered oil or gas drilling technology in light of profitability concerns.
- Continued innovations in fossil fuel development and alternative energy production will probably also lead to increased cyber espionage as groups try to obtain intellectual property and proprietary data for the benefit of state-owned companies.
- Growing global demand for energy and dwindling natural resources will likely result in increased cyber espionage against the sector as nation states seek intelligence that would afford them a competitive advantage when vying for energy security.
- Observed espionage by suspected Russian-based threat groups may target industrial control systems (ICS) and supervisory control and data acquisition (SCADA) systems.
- Conflict between countries could also result in increased threats as state-sponsored threat actors may try to increase pressure by disrupting the energy supplies.
- Environmental issues and other controversies related to energy production may also result in increased activity from hacktivists seeking to call attention to the issues and embarrass organisations that they view as responsible.

What are the major hurdles companies face when looking to implement a cyber security strategy?

We recently issued our Cyber Trendscape Report which surveyed over 800 IT executives across the globe to help organisations benchmark their cyber security initiatives. Part of the report looked at challenges that companies face with their cyber strategy. The report showed that many factors impact the maturity of an organisation's cyber security programme and its ability to be resilient against cyber threats. According to our findings, organisations reported that the main challenges they faced when it comes to implementing cyber security strategies were primarily IT and security technology maturity (over 80 per cent) followed by IT and security process maturity (80 per cent) and then visibility into threats (70 per cent). A majority of organisations (63 per cent) also indicated that it was a challenge to balance cyber security and day-to-day IT operational requirements. Looking at theses results, it's clear to us that organisations need a trusted cyber security partner who can help alleviate some of these pain points.

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Rig-less abandonment tools, a LEAN method by AlMansoori

The world's oil and gas-fields are full with wells to be abandoned. For various reasons ranging from no further production or integrity risks the well has to be abandoned.

Abandonment is costly, it does not generate revenue and is not seen by many stakeholders as adding huge value. As a response to this, AlMansoori has developed a technique whereby operators can do more with their abandonment budgets. This relies on the principles of LEAN whereby more is done with less. The technique, currently used on land-locations, comprises an approach whereby in the most extreme case, the rig is replaced by a crane with cementing and pumping equipment (combined with flare-stack and pit) and explosives are replaced by a perforating torch cutter using memory activation. Another application is coil tubing enabled abandonment. We have seen excellent results so far in different campaigns that have achieved a step-change in abandonment cost reduction and full integrity is achieved. These best practices are further enhanced when cementing is done on the fly.

AlMansoori performs these campaigns on the basis of total project management. This includes a well-head survey ensuring the appropriate accessibility on both the tubing and annular side. The downhole well status needs confirmation from the operator in particular when there are multiple zones in the well. Reconfirmation will be achieved as part of the job through slick-line intervention runs. An important element of this approach is to have the ability for un-obstructed circulation "tubing-in and annulus out". The subsequent execution of the abandonment is best described as that what carries elements of downhole work-flow tailor made for the specific conditions and based on the standards of the operator i.e. well killing, establishing injectivity in the (lower) zone, perforating with a torch cutter to open the tubing circulating for returns till gas free and pumping cement for reservoir cementing and eventually annular sealing up to surface.

A recent onshore well abandonment campaign in the MENA region confirmed the technical feasibility and moreover demonstrated the learning potential in our method. A 50 per cent improvement between the first and last job under similar conditions was demonstrated. Average abandonment jobs were driven down to two days per job (including rigging-up and down) with an average mob and demobilisation time between one and two days. In this context AlMansoori supports the industry with the first attractive step on the staircase of reducing the global abandonment liability.

AVEVA adds extra capabilities to its asset performance management portfolio

AVEVA announced a significant enhancement to its Asset Performance Management (APM) portfolio - the launch of AVEVA APM Assessment, AVEVA Asset Strategy Optimisation and AVEVA Asset Strategy Library.

The announcement completes the integration of the recently acquired MaxGrip software solutions into AVEVA's APM Portfolio. As a result, customers are now able to realise greater levels of reliability, availability, safety and efficiency in operating their capital assets, and move from reactive and predictive maintenance to prescriptive maintenance. Adding to AVEVA's comprehensive preventive, condition-based and predictive

software capabilities, the integrated solutions will empower the workforce to execute prescriptive guidance across engineering, operations and maintenance resulting in improved efficiency, safety and reliability.

"We have seen customer demand evolve from asset failure prediction to the need for integrated guidance and prescriptive actions. AVEVA is the first vendor on the market to offer the portfolio breadth and domain expertise to help customers fully realise untapped value, gain control of their asset strategy and prescribe and execute the most efficient action," commented Kim Custeau, Vice President of Asset Performance Management AVEVA. "With this set of capabilities, we are redefining the scope of Asset Performance Management to deliver improved business outcomes for our customers."

AVEVA's APM Assessment benchmarks a company's current practices against best in class performance and builds a comprehensive roadmap encompassing people, processes and technology. These metrics, including asset criticality, are then used in AVEVA Asset Strategy Optimization to balance risk, cost and performance of assets. ADNOC Gas Processing is working with AVEVA using predictive AI technology with prescriptive maintenance. "We value our strategic partnership with AVEVA, they set a very good example for what a good collaboration is, and the results that come from this are a game-changer for long-term equipment management and optimisation," commented Ahmed Mohamed Al Abri, vice president, Engineering & Technical Services ADNOC Gas Processing.

The platform to showcase cutting edge carbon capture and hydrogen strategies

Great strides have been made with technology to lower the cost and increase the efficiency of carbon capture, utilisation and storage and to introduce hydrogen as a methodology to industries where it has proved difficult to reduce emissions.

Many governments are offering incentives to fast track CCUS deployment and leveraging hydrogen's potential to play a key role in clean, secure and affordable energy.

Across the entire value chain, customised policies, dedicated finance and support for research and development are enabling the scaling up of technologies to reduce the harmful effect on the environment from difficult to de-carbonise industries including heavy industry, manufacturing, chemicals, metal production.

In response, dmg::events have announced two conferences, at the heart of the world's most important energy producing countries, to address the rising importance of this subject.

The international Carbon Capture, Utilisation and Storage (iCCUS) Conference will be held on 25-26 February 2020 at the Four Seasons Hotel in Riyadh, in the Kingdom of Saudi Arabia. The conference is co-organised under the patronage of the Minister of Energy of the Kingdom of Saudi Arabia and the Minister of Oil of the Kingdom of Bahrain.

Ahmad Al Khowaiter, Chief Technology Officer, Saudi Aramco and Chairman of the conference said, "Our world is faced with the dual challenge of providing access to clean and affordable energy to billions of people, while ensuring environmental sustainability and stewardship.

Despite the remarkable progress of renewable energies in the global energy mix and the significant improvement in energy efficiency, global greenhouse gas emissions have been fluctuating over recent years. The urgency to act on the climate, combined with the scale of ambitions in carbon emissions reduction requires a paradigm shift in the approach to climate policies and strategies.

We must dispose of our conventional notion of a linear economy growth model as a once-through system and adopt the principles of a circular carbon economy model which value all options to mitigate carbon dioxide emissions into the environment".

"CCUS is a key technology for removing, reusing, and recycling carbon dioxide emissions - addressing multiple dimensions of the circular carbon economy model. CCUS technology has come a long way and continues to demonstrate its technical feasibility", he continued.

"There are 18 large scale CCUS plants in operation across the globe, capturing and storing around 30 million tonnes of CO2 per year. But studies from the IPCC and IEA show that the world needs to capture, store or use around 1000 million tonnes of CO2 annually by 2030.

Realising the full value of CCUS remains a global challenge. Costs need to be reduced, global storage capacity needs to be consolidated and appropriate policy instruments need to be implemented in order to ensure widespread deployment of CCUS technology and meet global climate change ambition".

The iCCUS Conference will focus on the role of CCUS as a key enabler for the circular carbon economy and will contribute to improving CCUS recognition as a vital technology for achieving climate goals.

Run in conjunction with iCCUS is the Hydrogen Middle East Symposium (H2ME) to be held on 27 February 2020.

The use of hydrogen in the energy system is enjoying political and business momentum as policies and projects around the world are rapidly expanding.

The hydrogen debate has evolved over the past two decades, with a shift in attention from applications for the automotive industry to sectors that include aviation, shipping and heating applications.

Current conversations are focussing on fossil fuel-based hydrogen production (grey hydrogen); fossil fuel-based hydrogen production combined with carbon capture, utilisation and storage (CCUS; blue hydrogen); and hydrogen from renewables (green hydrogen).

H2ME will provide a leading international meeting place giving an opportunity for the hydrogen industry to present the latest hydrogen strategies, showcase recent hydrogen technology and R&D advances, network and exchange technical and industry related information.

Government officials, global policy makers, regulators, Chief Executive Officers, Managing Directors, Chief Technology Officers, Technologists and Scientists will join Chief Economists, Strategists and Analysts to talk about the key policy, critical regulatory and investment barriers and provide actionable solutions to the global challenges the CCUS and hydrogen markets face.

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iCCUS: www.iccusksa.com
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Global offshore discoveries and reserves

A look at Wood Mackenzie's January offshore data and rig stats from around the world

Offshore new discoveries

Water Depth	2015	2016	2017	2018	2019
Deepwater	25	12	17	14	14
Shallow water	85	66	72	46	40
Ultra-deepwater	20	16	12	17	13
Grand Total	130	94	101	77	67

Shallow water (1-399m), deepwater (400-1499m), ultra-deepwater (1500m+).

Offshore undeveloped recoverable reserves

Water Depth	Number of fields	Recoverable reserves liquids mbl	Recoverable reserves gas mboe
Deepwater	567	53006	22709
Shallow water	3245	312488	108127
Ultra-deepwater	347	53922	37687
Grand Total	4,159	419,417	168,523

Contingent, good technical, probable development
The total proven and probable (p+p or 2P) reserves which are deemed recoverable from the reservoir.

Offshore onstream and under development remaining reserves

Region	Number of fields	Remaining reserves liquids mbl	Remaining reserves gas mboe
Africa	736	28194	40392
Asia	1016	16137	37167
Europe	966	20359	23978
Latin America and the Caribbean	245	39360	11285
Middle East	144	169562	106995
North America	622	25029	4206
Oceania	117	2573	23113
Russia and the Caspian	71	26367	23616
Grand Total	3,917	327,581	270,752

Onstream and under development
The portion of commercially recoverable 2P (proven+probable) reserves yet to be recovered from the reservoir.

January 2020 rig stats

Updated as at 1/1/2020

Worldwide

Rig Type	Available	Contracted	Grand Total	Utilisation	Difference*
Drillship	24	65	89	73%	-2%
Jackup	116	336	452	74%	-4%
Semisub	41	65	106	61%	-6%

Africa

Rig Type	Available	Contracted	Grand Total	Utilisation	Difference*
Drillship	3	13	16	81%	-5%
Jackup	8	28	36	78%	-6%
Semisub	1	3	4	75%	0%

Middle East

Rig Type	Available	Contracted	Grand Total	Utilisation	Difference*
Jackup	26	117	143	82%	-2%
Drillship		2	2	100%	0%

Asia

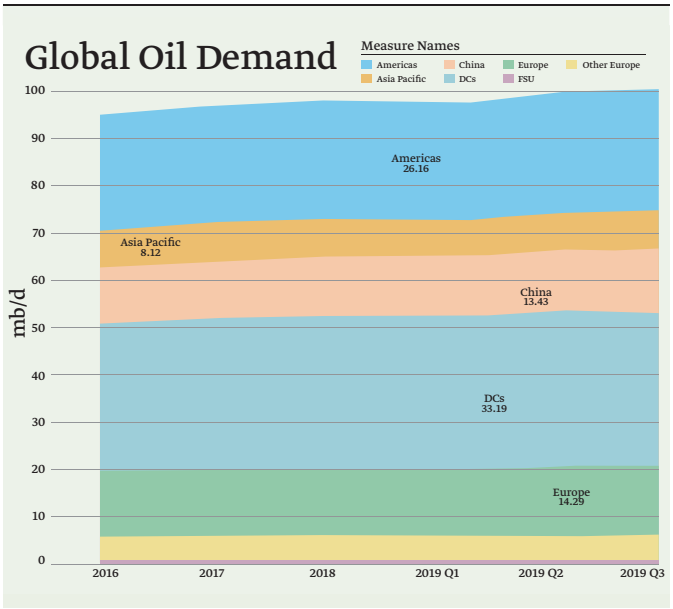
Rig Type	Available	Contracted	Grand Total	Utilisation	Difference*
Drillship	5	7	12	58%	-3%
Jackup	43	105	148	71%	-4%
Semisub	17	11	28	39%	-13%

Source [for all] : Wood Mackenzie

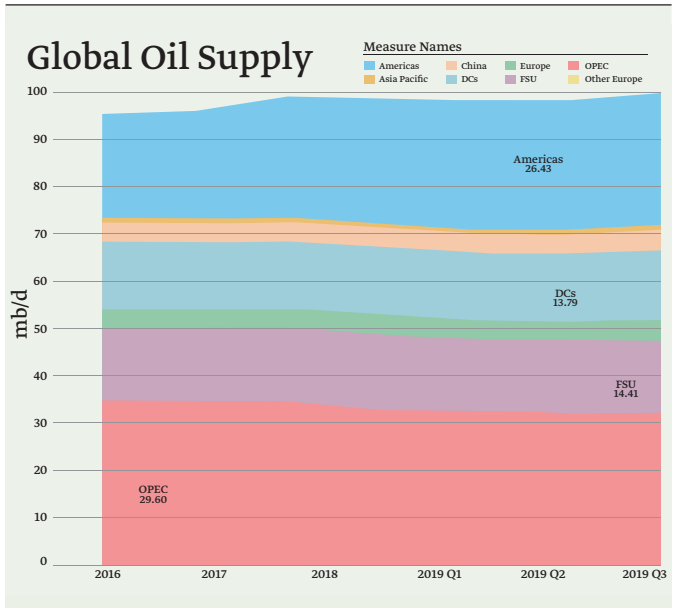
* % difference from the month before

Overview of global oil demand and supply

A snapshot of the global oil production and supply, OPEC and non-OPEC rig count



Source: OPEC



Source: OPEC

OPEC Rig Count

Rig Count	2016	2017	2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019
Algeria	54	54	50	47	49	42	41
Angola	6	3	4	5	5	4	3
Congo	2	2	3	4	4	3	2
Ecuador	4	6	8	9	8	9	6
Equatorial Guinea**	1	1	1	1	1	1	1
Gabon	1	1	3	7	6	7	9
Iran**	143	156	157	157	157	157	157
Iraq	43	49	59	65	75	77	77
Kuwait	44	54	51	44	44	46	48
Libya	1	1	5	11	15	16	16
Nigeria	6	9	13	14	14	16	18
Saudi Arabia	125	118	117	118	115	118	109
UAE	51	52	55	58	59	64	67
Venezuela	58	49	32	25	23	25	25

** Estimated data when Baker Hughes Incorporated did not reported the data.

Source: Baker Hughes

Non-OPEC Rig Count

Rig Count	2016	2017	2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019
US	509	875	1,031	1,045	990	920	819
Canada	131	207	191	185	83	131	138
Mexico	26	17	27	26	34	38	48
Norway	17	15	15	15	17	18	18
UK	9	9	7	13	16	16	13
OECD Europe	96	92	85	92	159	190	154
OECD Asia Pacific	7	15	21	24	29	31	30
Other Asia*	204	208	222	232	225	217	212
Latin America	111	112	123	128	122	123	113
Middle East	75	68	65	66	69	67	69
Africa	43	38	45	54	52	50	62

** Estimated data when Baker Hughes Incorporated did not reported the data.

Source: Baker Hughes

dmg events


ADIPEC 2019


Gastech 2019


EGYPS 2019

Events 2020

February

EGYPT PETROLEUM SHOW (EGYPS)
February 11-13, Cairo, Egypt
www.egyps.com

FUTURE ENERGY ASIA EXHIBITION & CONFERENCE
February 12 - 14, BITEC, Bangkok, Thailand
www.futureenergyasia.com

ICCUS CONFERENCE
February 25 - 26, Riyadh, Saudi Arabia
www.iccusksa.com

March

EAST AFRICA OIL & GAS SUMMIT AND EXHIBITION
March 18-19, Nairobi, Kenya
www.eaogs.com

May

THE CANADA GAS AND LNG EXHIBITION AND CONFERENCE
May 12-14,, Vancouver, Canada
www.canadagaslng.com

June

GLOBAL PETROLEUM SHOW (GPS)
June 9 - 11 June, Calgary, Canada
www.globalpetroleumshow.com

GAS INDONESIA SUMMIT
June 10 - 12, 2020
Jakarta, Indonesia
www.gasindosummit.com

September

GASTECH
September 8-10, Singapore
www.gastechevent.com

INTERNATIONAL PIPELINE EXPOSITION (IPE)
September 28 - 30, 2020
Telus Convention Centre
Calgary, Alberta

November

ABU DHABI INTERNATIONAL PETROLEUM EXHIBITION & CONFERENCE (ADIPEC)
November 9-12, Abu Dhabi, UAE

OUR SERVICES

Drexel Oilfield Equipment

SKJ

DOWN STREAM SERVICES

•Catalyst Handling Services
-Unloading & Loading of catalyst under Inert or normal atmospheres.
-Dense Phase loading of vertical and Horizontal vessels.
-Catalyst screening, density grading and Oxidization.
-Vacuum unloading with closed loop Nitrogen re-circulation.
-Catalyst Loading of reactors using UOP Dense Loading and conventional techniques
-Tubular Reformer loadings using unidense Loading and conventional techniques
-Pre-sulphiding (DMDS Injection)
-Video inspection and assessment

- Process Services
-Gross Leak Test (GLT)
-Air Drying & Dehydration
-Nitrogen Services
-Chemical Cleaning
-Heat Exchanger Cleaning

- Pipeline Services (PPL)
- PPL Hydrostatic Testing
- PPL Air/ N2 Drying
- PPL Pigging
- PPL Cleaning
- Pumping Services

SAFETY SOLUTIONS

-Respiratory Solutions
-Gas Detection Solutions
-Fire Protection Solutions
-Fall Protection Solutions
-Rescue Services
- Rope Access

SPECIALIZED SUPPLIES & SERVICES

-MEG
-Castrol Hydraulic Fluids
-Straub (Pipe Couplings)
-SAFI Plastic Valves
-Pipes Sealing & Corrosion Protection
-Cathodic Protection
-Pipe Joint Fills and Foam Products
-Shrink Sleeves

UPSTREAM & MARINE SERVICES

Drilling Services:
-MWD and Survey Tools
-Rig Instrumentation Control Systems
-Centralizers
Marine Services:
-Subsea Fluids
-ROV Systems and sensors
-Underwater Cameras and Video
-Cable / Riser Protection System
- Simulation Services
Water Treatment:
-RO Desalination Plants
-Waste Water Treatment Plants (WWTP)
-Filtration / Water injection Systems

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