Strategy for Success
Increased Interest in the Petroleum Sector
Egypt Emerging as Regional Gas Hub
The Human Element
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Our Contacts:
Ashraf Fahmy
Country Managing Director, Egypt
ashraf.fahmy@protivitiglobal.me
+202.25864560

Manish Laligam
Managing Director - Energy & Utilities
manish.laligam@protivitiglobal.me
+971.52.9998939
Apache Corporation has over 20 years of experience operating in Egypt and is the leading American investor in the country.

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With more investments flowing in and natural gas exports on the rise, Egypt is moving steadily closer to its goal of becoming an energy hub for the Eastern Mediterranean region. This progress is supported not just by new discoveries and increased production, but also by a comprehensive reform strategy that aims to help Egypt make the most of its oil and gas resources at home and in international markets.

Chapter one in this edition of the Energy Industry Insight looks at the Oil & Gas Modernization Project, with updates on the state's seven-pillar program overhauling every aspect of the petroleum sector, along with how the private sector is responding to and participating in the reforms. The second chapter provide updates on the sector as a whole, with the latest discoveries and production plans, the state of the trade balance, and current threats and opportunities. Chapter three charts the latest moves in the Mediterranean Basin as Egypt cements its position as an energy hub. And finally, the fourth chapter takes a detailed look at the Ministry of Petroleum's push to develop its human resources from entry-level employees to top management.
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The past decade has been a roller coaster for Egypt’s petroleum sector. Before the revolutions of 2011 and 2013, the country was on relatively steady footing for meeting its hydrocarbon needs, with a surplus of natural gas, slight deficits in oil and proven reserves holding steady. But the political and economic turmoil following the uprisings hit the sector hard, especially as inflows of foreign exchange dried up. Exploration and production (E&P) investments and activity stalled, in part because of a lack of bid rounds and in part for lack of compensation. Consumption outstripped production, and as the government diverted oil and gas normally earmarked for export to the local market, it racked up billions of dollars in debt to international oil companies (IOCs). On the street, people felt the crunch in the form of frequent power outages and empty gasoline pumps.
The depth of crisis exposed serious flaws in how the petroleum sector was being managed. To win back the confidence of investors and make the sector sustainable, a complete overhaul was needed. Thus in June 2016, the Ministry of Petroleum and Mineral Resources (MoP) launched the Oil and Gas Modernization Project (OGMP). Guided by the long-term goals of the Sustainable Development Strategy (SDS): Egypt Vision 2030, released in February 2016, the OGMP aims to liberalize the petroleum market, introduce innovation to and restructure the industry across the entire value chain to meet the needs of the 21st century. With its focus on ministry-wide reform, the project also creates a new model for other sectors to follow.

The OGMP started with a diagnostic phase, where the MoP worked with consultants to analyze the oil and gas sector to identify areas for improvement. The results, covering four main areas, found several key issues to address:
- Financial sustainability: energy subsidies, production and consumption levels, operational efficiency
- Asset sustainability: concessionary regime, arrears to IOC,
- Organizational sustainability (sector): demarcation of sector roles, inter-ministerial coordination, reform of the sector structure and decision processes.
- Organizational sustainability (entity): organizational capabilities and skills.

Armed with these findings, the MoP next held a one-day workshop with 50 leaders from the private and public sectors to create a development plan for the OGMP. As part of the workshop, the stakeholders agreed upon the project’s five core values and three main objectives.

**OGMP Values and Objectives**

- **Safety**
- **Innovation**
- **Efficiency**
- **Ethics**
- **Transparency**

**Objectives**
- Achieve financial sustainability
- Become a Regional Energy Hub
- Become a model for Egypt’s future

Source: Ministry of Petroleum
With the vision and values in place, the ministry launched the implementation phase in April 2017, which first identified seven strategic policy measures and priorities—known as pillars—aimed at improving the performance of the oil and gas sector while keeping up with market changes locally, regionally and globally. This phase also lays out a detailed timeline with specific milestones and quick wins. Ministry officials say a third phase, which will also fall under the implementation phase, is currently being planned and will be revealed at a later date.

Guiding the implementation is a steering committee, responsible for establishing priorities, allocating resources, approving decisions related to the project’s pillars, approving policies and plans, acting as a main interface, and leading inter-ministerial discussions. Reporting to the committee is a realization office which manages program teams for each pillar.

The modernization project has attracted international support, including from the World Bank (WB) and the European Bank for Reconstruction and Development (EBRD). The WB has signed on to provide advisory services, analytics, and management capacity building for the MoP, while the EBRD is providing technical assistance with a focus on process re-design aimed at improving business practices, performance and transparency. The United States and the European Union have offered support for specific pillars of the project, such as the Regional Energy Hub initiatives.

The OGMP has also been applauded by IOCs as it secures their current investments and encourages future ventures. Paul Griffith, vice president, operations & resource development - Egypt region at Apache Egypt Companies, says that the OGMP “allows Apache to map out a future for improving operation excellence, maintaining a competitive marketplace and developing talent.”

Hussam Abuseif, director & general manager for Egypt and Sudan of Baker Hughes, a GE Company (BHGE), considers the project “to be a framework to guide companies to better operate, and works toward a common goal and vision.”

**Pillar 1: Upstream Investment Attraction**

The first pillar of the modernization project focuses on accelerating and increasing foreign direct investments, especially for upstream E&P activities, by making the investment environment more attractive.

One of the first orders of business was to start paying down debts to the IOCs, a process that started in earnest in FY 2014/15. As of July 2019, the government owed less than USD 1 billion, down from a peak of USD 6.3 billion.

**Arrears to IOCs (USD billion)**

![Graph showing arrears to IOCs from 2010/11 to 2018/19.](image)

*Source: Media reports*
The ministry has also developed a new international bid round system that has reduced the number of bid round cycles and improved the efficiency of evaluation. Complementing that system is the ministry’s new model for concession agreements, which offers more flexible production-sharing contracts.

To attract investments to unexplored areas, the Ganoub El-Wadi Holding Company (GANOPE), contracted TGS and Schlumberger to acquire seismic data for an 11,000 km area of the Red Sea. After the first phase of this acquisition was completed, GANOPE issued an E&P tender for 10 Red Sea blocks in Q1 2019. Other seismic data collection projects are in the pipeline, including one for the Western Mediterranean and Red Sea.

“The government has exerted significant efforts and has been taking right and well-informed decisions that have made investment more attractive,” says Brian Essner, vice president international marketing & Egypt country manager for Noble Energy Egypt. “This has encouraged us to be more aggressive, coming into the country as both a gas seller and a midstream player with pipeline ownership, but looking for upstream opportunities as well, which is in line with Noble Energy’s strategy.”
Pillar 2: Sector Structure Reform

The second pillar promotes a lean, efficient sector structure with clearly separated policy, regulatory and execution entities. Its focus is on demarcating sector roles, promoting organization restructure, and improving sector governance. The pillar also focuses on developing efficient, effective collaboration with joint venture (JV) partners.

Success in this area depends on empowering operating companies, streamlining business processes and introducing best-practice governance to help state-owned enterprises (SOEs) generate value. To bring SOE governance in line with international best practices, a new code is under development to look at ownership and board governance; risk management and internal control; shareholder and stakeholder relations; and transparency and disclosure.

Out of all the pillars, Griffith believes that the second is the most challenging, in part because restructuring needs to incorporate a long-term strategy. “All assets move from discovery to growth period through development before reaching a mature status through depletion. As the mix of petroleum assets in Egypt move through their life cycles, the upstream petroleum sector will need to plan for the future with an emphasis on lowering its cost structure.”

Petroleum Sector Roles

Objectives
- Demarcate sector roles
- Restructure the organization
- Improve sector governance
- Optimize JV affiliates portfolio

Achievements*
- Proposed a new sector structure
- Finalized the administrative and legal approvals
- Worked on financial due diligence for the major entities in the sector

* As of FY 2018/19
Pillar 3: Human Resource Management

The third pillar focuses on human resource (HR) development from entry level up to the top ranks of leadership, with the goals of increasing employee satisfaction and productivity, creating a culture of high performers, and building a globally competitive workforce. There is a strong emphasis on training, particularly in developing management prospects and quality, health, safety, environment (QHSE) practices. But digitization of the HR management systems also plays a substantial role. “Digitalization has become an integral part of the future of any sector, not just oil and gas,” says BHGE’s Abuseif. “I believe it brings a younger pool of human capital with a new skill set that can support the transformation of the industry.”

(For more on this pillar, see the chapter on “The Human Element” on page 34.)

Objectives

• Overcome HR’s main challenges: overstaffing and talent management
• Revise the HR system with new payment scheme, performance-based appraisal and succession planning
• Improve talent through career planning, capacity building and middle management development
• Create a database for all the sector’s employees

Achievements*

• Developed a succession plan to select the sector’s top leaders
• Launched the first round of the Middle Management Development Program
• Launched a program to modify existing and new JV models with IOCs
• Established a comprehensive database for all sector employees
• Generated a methodology to analyze the HR sector
• Captured QHSE as one of HR’s core values through the provision of awareness and capacity building sessions

* As of FY 2018/19
The fourth pillar aims to boost Egypt’s downstream performance in refining and petrochemical production. Objectives include better utilization of Egyptian petroleum assets, increased energy efficiency across the value chain, reduction of imports of high-end refined products, and establishing Egypt as a global competitor in petrochemicals exports.

The MoP has already implemented many technical, managerial and legal procedures to enhance the efficiency of energy consumption in refineries and other petrochemical production projects. Several existing refineries are currently being upgraded, while new projects are close to completion.

**Pillar 5: Upstream Performance**

The fifth pillar looks at improving upstream performance with emphasis on boosting oil and gas production, increasing recovery rates and maximizing proven reserves. This is to be achieved through harnessing new technologies, drilling new wells, reducing costs and energy consumption, and focusing on lean operations through adopting new agreement models. With large-scale discoveries coming online and production ramping up, Egypt achieved natural gas self-sufficiency and started exporting natural gas again in 2019.
Pillar 6: Hub Strategy

The discovery of substantial gas reserves in the Eastern Mediterranean—notably in the Zohr, Nooros and Atoll fields—has led to the sixth pillar of the modernization strategy, which aims to position Egypt as the regional energy hub. The objective here is to conduct a comprehensive assessment of how to optimize and leverage existing assets for oil and gas transport, processing and storage to create the hub.

For more information on this pillar, see the chapter on “Egypt Emerging as Regional Gas Hub” on page XX.

Pillar 7: Decision Support and Data Flow

The latest addition to the OGMP strategy is the decision support and data flow pillar, focused on increasing the digitization of reporting and decision processes across the sector via an Enterprise Resource Planning (ERP) solution with uplinks to the ministry’s Information Center.

The MoP is planning to set up a comprehensive information system and communications network to link all of the ministry’s holding companies and their subsidiaries to facilitate communication and information exchange as well as produce daily reports and updated production data.

During EGYS 2019, the MoP signed a cooperation agreement with BHGE to launch the Egypt Gateway project, an electronic portal to market upstream tenders and other opportunities in Egypt. BHGE is to provide digital infrastructure, training, and consultancy services related to bid round management.

Apache is also engaging with the ministry on the digital front. “The Industrial Internet of Things (IIOT), the Digital Oil Field and Data Analytics are popular buzzwords in the hydrocarbon industry today. The ministry has expressed an interest in advancing these concepts here,” says Mark Konecki, region operations director. “Apache Egypt is working on several initiatives [related to] measurement, one-time data entry and real-time field optimization. Developing a robust telecommunication infrastructure in our remote operating areas will have a positive impact on our ability to successfully implement these ideas.”
The boost in exploration and production (E&P) activity has re-vitalized Egypt’s petroleum industry, leading to an increase in investments. In the first three quarters of FY 2018/19, petroleum and natural gas accounted for around 8.7% of the real Gross Domestic Product (3.5% petroleum and 5.1% natural gas). In that same period, gas extractions posted the largest annual growth among all economic sectors, reaching a peak of 24%. As a sector, petroleum had a similarly outstanding performance in attracting foreign direct investment (FDI), where 51.8% of net FDI went into the sector.
While Egypt’s total proven oil reserves remained stable at 3.3 billion barrels at the end of 2018, the total proven natural gas reserves increased year-on-year by 12.7 trillion cubic feet (tcf) to reach 75.5 tcf. Fifteen new gas discoveries, five in the Mediterranean and 10 in the Western Desert, boosted reserves to 817 billion cubic feet (bcf) of gas and 2.2 million barrels of condensates. In FY 2019/20, Egypt plans to develop and operate 11 existing E&P projects, worth a total USD 2.7 billion in investments. The focus will be on maximizing production at Zohr, Raven, Baltim Southwest, West Nile Delta Phase 9B, North Sinai Phase 2, Nour-1 and West El Burullus fields, among others. The target is to increase Egypt’s production by 2.5 bcf/d of natural gas and 32,000 barrels per day (b/d) of crude oil and condensates.

Egypt’s Production by Area (as of August 2019)

<table>
<thead>
<tr>
<th>Area</th>
<th>Crude Oil (b/d)</th>
<th>Condensates (b/d)</th>
<th>Gas (mcf/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>180</td>
<td>11,025</td>
<td>1,199</td>
</tr>
<tr>
<td>Eastern Desert</td>
<td>67,858</td>
<td>75</td>
<td>11</td>
</tr>
<tr>
<td>Gulf of Suez</td>
<td>123,709</td>
<td>1,931</td>
<td>88</td>
</tr>
<tr>
<td>Mediterranean Sea</td>
<td>423</td>
<td>29,530</td>
<td>4,402</td>
</tr>
<tr>
<td>Sinai</td>
<td>50,203</td>
<td>539</td>
<td>0</td>
</tr>
<tr>
<td>Upper Egypt</td>
<td>177</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Western Desert</td>
<td>301,794</td>
<td>37,425</td>
<td>1,215</td>
</tr>
</tbody>
</table>

Sources: BP Statistical Review of World Energy 2019; Egypt Oil and Gas, October 2019; EGAS Annual Report FY 2018/19
Increased Interest in the Petroleum Sector

Oil

Oil production comes from four main areas: the Western Desert, Gulf of Suez, Eastern Desert and Sinai. The Western Desert alone produces more than half of the oil in Egypt, accounting for 57% in 2018. In H1 2019, crude oil and condensates production increased to 660,000 b/d. In September 2019, the Ministry of Petroleum and Mineral Resources (MoP) announced an additional 10 exploration wells in the Western Desert’s East Bahareya Extended Area 3 with a production of 5,000 barrels of oil equivalent per day (boe/d).

While declining reservoir pressure has slowed production in some concessions, projects implemented under the Oil & Gas Modernization Project have managed to optimize output to recover almost 100,000 b/d of crude oil from mature wells. Crude oil production is targeted to increase 40,000-50,000 b/d to reach 710,000 b/d in June 2020, primarily through developing the current oil fields and using 3D seismic scans to identify new fields.

Egypt has eight active refineries with a total capacity of 716,000 barrels per day (b/d). The main refineries are El Nasr Petroleum, Mostorod and Middle East Oil Refinery (MIDOR). There are a number of projects underway, with investments of around USD 8 billion, to upgrade existing refineries to improve capacity and performance, with a focus on high-value fuel products.

The United Kingdom’s TechnipFMC is carrying out the expansion of MIDOR, the nation’s most advanced refinery. Due to be complete in 2020, the upgrades will raise MIDOR’s crude oil processing capacity from 115,000 b/d to 175,000 b/d; diesel capacity from 12,300 b/d to 70,000 b/d; and gasoline capacity from 11,900 b/d to 32,600 b/d.

At the Mostorod complex, Egypt’s Qalaa Holdings has built and completed testing at the Egyptian Refining Company, a new facility with a capacity of 84,000 b/d that will process residual fuels from other Egyptian refineries into middle distillate products. The project is set to come fully online in 2020.

In Upper Egypt, American engineering company Bechtel is carrying out a USD 1.5 billion modernization project at the Assiut Oil Refining Company (ASORC) to increase diesel fuel production for the local market.

Refined Products (000 b/d)

![Graph showing refined products (000 b/d) from 2017 to 2023.](source: Fitch Solutions Q4 2019)
Crude Oil Refining Capacity (’000 b/d)

Source: Fitch Solutions Q4 2019

Refineries in Egypt

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Capacity (b/d)</th>
<th>Ownership</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Nasr</td>
<td>Suez</td>
<td>142,000</td>
<td>EGPC via El Nasr Petroleum Company</td>
<td>1913</td>
</tr>
<tr>
<td>El Mex</td>
<td>Alexandria</td>
<td>140,000</td>
<td>EGPC via Alexandria Petroleum</td>
<td>1957</td>
</tr>
<tr>
<td>Mostorod</td>
<td>Cairo</td>
<td>145,000</td>
<td>EGPC via Cairo Oil Refining Company</td>
<td>1969</td>
</tr>
<tr>
<td>MIDOR</td>
<td>Alexandria</td>
<td>100,450</td>
<td>Middle East Oil Refining</td>
<td>2000</td>
</tr>
<tr>
<td>Ameriya</td>
<td>Alexandria</td>
<td>75,000</td>
<td>EGPC</td>
<td>1972</td>
</tr>
<tr>
<td>El Suez</td>
<td>Suez</td>
<td>65,250</td>
<td>EGPC via Suez Oil Processing</td>
<td>1921</td>
</tr>
<tr>
<td>ASORC</td>
<td>Assiut</td>
<td>90,405</td>
<td>EGPC via Assiut Oil Refining</td>
<td>1972</td>
</tr>
<tr>
<td>Tanta</td>
<td>Tanta</td>
<td>38,000</td>
<td>EGPC via Cairo Oil Refining Company</td>
<td>1969</td>
</tr>
</tbody>
</table>

Proposed Capacity Expansion

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Capacity (b/d)</th>
<th>Ownership</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostorod - Expansion</td>
<td>Cairo</td>
<td>84,000</td>
<td>Qalaa Holding, Cairo Oil Refining Company</td>
<td>2019</td>
</tr>
<tr>
<td>MIDOR - Expansion</td>
<td>Alexandria</td>
<td>50,000</td>
<td>Middle East Oil Refining</td>
<td>2022</td>
</tr>
<tr>
<td>El Mex - Upgrade</td>
<td>Alexandria</td>
<td>12,000</td>
<td>n/a</td>
<td>Unknown</td>
</tr>
<tr>
<td>ASORC - Upgrade</td>
<td>Assiut</td>
<td>9,300</td>
<td>n/a</td>
<td>Unknown</td>
</tr>
<tr>
<td>Suez</td>
<td>Suez</td>
<td>500,000</td>
<td>Egypt-Saudi-Kuwait JV</td>
<td>Delayed since 2009</td>
</tr>
<tr>
<td>Ain Sokhna</td>
<td>Red Sea</td>
<td>130,000</td>
<td>n/a</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Source: Fitch Solutions Q4 2019
Gas

Natural gas has taken center stage in Egypt, and not just because of the massive increase in reserves found in the Mediterranean. Compared to coal and nuclear energy, natural gas is a better fuel for power plants because the infrastructure is cheaper and quicker to set up, and less fuel is needed to generate a large amount of electricity. It is also the cleanest of the fossil fuels. About 70% of Egypt’s electricity is fueled by natural gas.

In FY 2018/19, natural gas production increased year-on-year by 21%. The supergiant Zohr field has reinstated Egypt’s position as a natural gas producer and changed the outlook for its gas sector. In September 2018, the MoP announced that Egypt has achieved self-sufficiency in locally produced natural gas; as a result, the government halted liquefied natural gas (LNG) imports for the first time in more than three years. A year later, natural gas production saw an unprecedented boost to 7 bcf/d, driven mostly by four Mediterranean Sea concessions (Zohr, West Nile Delta, Nooros and Atoll).

Gas Production by Fields

Note: 2019-2027 data are forecasts.
Source: Egypt’s Natural Gas Market Overview, 2018 IGU, TAQA, EGA
Discovered by Italy’s Eni in 2015, Zohr is currently Egypt’s largest field with estimated reserves of 30 tcf. After selling stakes to the UK’s BP, Russia’s Rosneft and the United Arab Emirate’s Mubadala Petroleum, Eni has been fast-tracking Zohr’s production. In August 2019, production reached 2.7 bcf/d, five months ahead of the scheduled date. Two more wells are expected to come online by the end of the year, bringing the total to 14, and Eni is reportedly planning to drill nine new development wells in 2020. The project’s total investments increased by USD 3 billion in FY 2018/19 to reach USD 10.6 billion at the end of August 2019.

The Great Nooros area, part of Eni’s Offshore Nile Delta concession, encompasses the Baltim Southwest and Nooros fields, which together hold around 3 tcf of gas. In 2018, Nooros’ production hit 215,000 boe/d, the highest level at an Eni field in the last 50 years. Baltim Southwest began production in September 2019 at 100 million standard cubic feet per day (mmscf/d) and is expected to reach 500 mmscf/d in Q1 2020.

BP’s West Nile Delta (WND) project holds an estimated 5 tcf of gas and 55 million barrels of condensates. Phase one (Taurus and Libra) and phase two (Giza and Fayoum) have come online, while phase three (Raven) is expected to start production by the end of 2019. The Raven field includes eight wells and an onshore plant with a production capacity of up to 900 mmscf/d of gas and 25,000 b/d of condensates. Additional phases are planned for the future.

The Atoll field in BP’s North Damietta Offshore Concession hold an estimated 1.5 tcf of gas and 31 million barrels of condensates. Production began in 2018 and was expected to reach 400 mmscf/d in October 2019. Three of Atoll’s four wells are already producing, with the fourth expected to come online in Q1 2020 with 100 mmscf/d.

Oil Merchandise Trade Balance (USD million)

Egypt’s petroleum imports come mostly from Arab countries, while its crude oil and petroleum product exports flow mostly to Europe. Crude oil imports are expected to decrease over time as refinery upgrades make local production more efficient.

Source: CBE Bulletin
Increased Interest in the Petroleum Sector

IOCs in Egypt

There are around 50 international oil companies (IOCs) operating in Egypt, with the leading players Eni, BP, Shell and Apache Energy.

Eni has been operating in Egypt since 1954 through its subsidiary, the Italian Egyptian Oil Company. In addition to Zohr and Nooros, Eni’s portfolio includes discoveries in the East Oayed Concession and the Faghur Basin. In H1 2019, the oil and gas output from its Egypt assets rose 23% from 275,000 boe/d to 339,000 boe/d.

BP Egypt moved into the number-two position in terms of gas reserves after buying a 10% stake in Zohr from Eni in 2016. BP’s portfolio consists of mature oil production from its Gulf of Suez fields and new gas developments in the Mediterranean. BP also holds a 25% stake in Eni’s Nour concession in the East Nile Delta.

Shell Egypt holds the fourth largest reserves in the country and has been one of the major operators through its Western Desert projects at Badr el Din, North East Abu Gharadig and Obaiyed. It also operates the West Nile Delta’s Phase 9B project alongside Petronas. In October 2019, the company announced it would put its onshore Western Desert assets on the market, explaining in a statement, “We remain committed to Egypt and see our future in supporting the government’s energy hub vision by growing Shell positions across the offshore and LNG value chain.” In Q2 2020, Shell will start exploration at its newly acquired oil and gas concessions in West Fayoum, South East Horus and South Abu Sennan.

Apache Egypt Companies has been the leading operator in the Western Desert since 1994, with the most significant of its assets the Qasr gas field, Shushan Basin paleozoic oil and gas fields, and East Bahariya oil development area. In Q2 2019, Apache brought 11 new gross operated wells online utilizing and seven active rigs. Paul Griffith, Apache’s vice president, operations & resource development - Egypt region, says, “We see Egypt as fertile ground for continued investments in new exploration and development drilling projects. Apache Egypt’s success is attributed in part to our leadership in 3D seismic acquisition across the Western Desert.”

Upstream Investments

With FDI the main driver for developing Egypt’s petroleum resources, the MoP is pushing to create a more investment-friendly climate. As of September 2019, hydrocarbon investments had reached USD 30 billion, mainly from Europe, the United States and Arab countries. According to Fitch Solutions analysts, the surge is due to “low cost break-evens, significant existing infrastructure, technical knowledge and an improving regulatory environment.”

In 2018, the Egyptian Natural Gas Holding Company (EGAS) and Egyptian General Petroleum Company (EGPC) held a joint bid round for 16 natural gas concessions and 11 oil concessions, with winners announced in February 2019. The biggest news from the round was that ExxonMobil won an offshore gas exploration block, marking the American IOC’s debut in Egypt’s upstream sector. Hesham EIAmroussy, chairman and managing director of ExxonMobil Egypt and chairman of AmCham Egypt’s Oil and Gas Committee, explains that “the evident development and progress in Egypt’s socio-economic environment in the past few years and the modernization of the oil and gas sector in particular, along with the political stability, has encouraged ExxonMobil to evaluate opportunities for upstream business in Egypt.”

Gas exploration blocks were also awarded to Shell, Petronas, BP, Wintershall DEA, and Eni, while oil exploration blocks were awarded to Neptune Energy, Merlin, Eni and the EGPC. Other bid rounds are expected during the next fiscal year, notably in the regions of the Red Sea and the Western Mediterranean.

Hussam Abuseif, director & general manager of the oilfield services company Baker Hughes, a GE Company (BHGE), says that BHGE is attracted to Egypt by “a lot of opportunities for business expansion, especially when it comes to the gas market in the East Mediterranean area. Additionally, we’re seeing a lot of efforts from the government to ease investment regulations, especially in the free zone sector and infrastructure. Gas presents a huge opportunity in Egypt, so do opportunities for localization.”

To keep IOCs interested, the MoP has been steadily paying off its debts to the IOCs, which had accumulated in the wake of the 2011 and 2013 revolutions. As of July 2019, the MoP reported that arrears stood at USD 900 million, compared to USD 3.4 billion at the end of FY 2015/16.
Market Regulation

E&P companies enter a country looking for a return on investment, particularly through exporting their oil and natural gas production. In Egypt, the oil concession system already allows IOCs to export crude oil once domestic demand is satisfied, with agreements customized to the concession. EGPC and the Ganoub El Wadi Petroleum Holding Company have a preferential rights to purchase the oil at a set price to meet local market requirements, but if they choose not to do so, the contractor is free to dispose of his share of production through export or to local buyers.

As part of comprehensive reforms to the natural gas sector, the government has embarked on a gradual gas market liberalization scheme. The Natural Gas Law 196 of 2017 was passed in August 2017 and fully took effect in February 2018 when the executive regulations were issued. The law allows private companies to use the state-owned national gas grid to import, transfer and distribute natural gas to the local market. Apache’s Griffith notes, “Changing laws to allow commodity sellers to negotiate directly with buyers will drive improvements in competitive market places.”

The law also created the Gas Regulatory Authority (GasReg), an independent body to oversee all activities related to Egypt’s natural gas market. GasReg is charged with facilitating the transportation of natural gas, maintaining the natural gas infrastructure, granting licenses for its use, establishing mechanisms for calculating tariffs, and promoting a competitive market. GasReg has announced that the market would be fully liberalized by 2022.

According to Amira El-Mazni, former vice chairman of gas and regulatory affairs at EGAS, after the Natural Gas Law took effect, Egypt earned membership in the Association of Mediterranean Energy Regulators (MedReg), an organization that promotes the integration of the energy markets in the Mediterranean region through transparent, stable and compatible regulatory frameworks in its member countries.

In FY 2019/20, Egypt implemented a new fuel price indexing mechanism, where the local market prices of vehicle fuels, compressed natural gas (CNG) and natural gas for households are adjusted quarterly within a 10% bracket based on international market prices. In October, the government reduced the prices of all grades of fuel by EGP 0.25 to reflect real-time Brent crude prices and the USD value against the EGP.

Also in October, the government cut natural gas prices by 25% for the cement industry to USD 6/metric million British thermal units (mmBtu), and 21% for metallurgy and ceramic industries to USD 5.5/mmBtu. Minister of Public Enterprise Sector Hesham Tawfik told the media that a committee would review natural gas and electricity prices for factories every six months and revise them as needed.
Increased Interest in the Petroleum Sector

Indexing Vehicle Fuel Prices

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Sources: Media reports

Brent Crude Oil Prices (USD/barrel)

Sources: Media reports
Oil and Gas Fields and Infrastructure in Egypt

Sources: U.S. Energy Information Administration; Petroleum Economist
Egypt is moving ever closer to becoming a major natural gas hub for the Middle East and Africa (MEA) and the Mediterranean regions. The MEA is already one of the most important hydrocarbon-producing regions in the world, accounting for 23.8% of the world’s gas production and 42.2% of its oil production. Egypt is Africa’s second largest natural gas producer after Algeria and the fifth largest in the Middle East. Besides being a key player regionally, Egypt is among the top 20 countries globally in terms of proven gas reserves, production and consumption.
Egypt plays an essential role in the region’s energy market as a terminus point in the Arab Gas Pipeline (AGP), which runs through Jordan, Syria and Lebanon. Egypt is also linked to Israel via the EMG Pipeline between the Israeli port of Ashkelon and Egypt’s El Arish, where it is connected to the AGP.

Positioning Egypt as a regional energy hub has been a national priority since February 2016, when it was listed as a goal in the Sustainable Development Strategy (SDS): Egypt Vision 2030. In the SDS, this goal is just one part of a larger energy picture focused on sustainable economic growth with diversified energy sources, including renewables. It is the Oil and Gas Modernization Project (OGMP), with its focus on the petroleum sector, that charts the path for making the hub happen.

One of the primary factors in Egypt’s favor is its location, strategically situated between resource-rich countries and large consumption markets. The benefits of Egypt’s location are enhanced by the country’s extensive petroleum infrastructure. For oil and petroleum products, this includes 19 petroleum terminals along the Mediterranean and the Gulf of Suez, 15 million tons of storage capacity, and the Suez-Mediterranean (SUMED) pipeline connecting Ain Sokhna on the Red Sea with Sidi Kerir on the Mediterranean. Egypt’s natural gas export infrastructure is the largest in the Eastern Mediterranean region with an overall capacity of 35 billion cubic meters (bcm) (1.2 trillion cubic feet [tcf]). This includes 29 treatment facilities, one floating storage regasification unit (FSRU), and two liquefied natural gas (LNG) facilities.

The Idku LNG plant—owned by Royal Dutch Shell (35.5%), the state-owned Egyptian General Petroleum Corporation (EGPC) and Egyptian Natural Gas Holding Company (EGAS) with 12% each, and Gaz de France (5%)—has a production capacity of 7.2 million tons per year. The Damietta LNG plant—jointly owned by Eni and Union Fenosa Gas (UFG), and operated by UFG subsidiary Spanish Egyptian Gas Company

| Natural Gas Production (bcm) in the Middle East and Africa |
|-----------------|---------|---------|---------|
|                | 2016    | 2017    | 2018    |
| Iran           | 199.3   | 220.2   | 239.5   |
| Qatar          | 173.8   | 172.4   | 175.5   |
| Saudi Arabia   | 105.3   | 109.3   | 112.1   |
| Algeria        | 91.4    | 93      | 92.3    |
| UAE            | 60.3    | 62      | 64.7    |
| Egypt          | **40.3**| **48.8**| **58.6**|
| Nigeria        | 46.2    | 48.1    | 49.2    |
| Oman           | 31.5    | 32.3    | 36      |
| Kuwait         | 16.4    | 16.2    | 17.5    |
| Bahrain        | 14.4    | 14.5    | 14.8    |
| Iraq           | 9.9     | 10.1    | 13      |
| Libya          | 9.4     | 9.6     | 9.8     |
| Syria          | 3.5     | 3.4     | 3.6     |
| Yemen          | 0.5     | 0.5     | 0.6     |
| Others         | 30.6    | 35.7    | 36.8    |
| **Total**      | **832.8**| **876.1**| **924** |

Source: BP Statistical Review of World Energy 2019
Egypt Emerging as Regional Gas Hub

(SEGAS)—has a capacity of 4.8 million tons per year. Operations in both plants ceased in 2014 after the government diverted the declining natural gas production to the local market. Idku resumed operations at the start of 2019, and in June, BP and Eni started using Idku to export gas from their North Alexandria and Zohr fields, respectively. Idku exported 500 mmcf of LNG in June, for a total of 172.8 bcf of LNG in FY 2018/19.

The Damietta plant remains shut while UFG and the government negotiate a settlement related to UFG’s arbitration claim filed after Egypt stopped feeding gas to the plant. In September 2018, an international arbitrator ruled in favor of UFG and fined Egypt USD 2 billion. The plant is expected to reopen after the two parties reach a settlement.

Brian Essner, Noble Energy’s country manager in Egypt, says, “Liquefaction plants provide upside opportunities in the event that market liberalization accelerates and we are able to access these important pieces of export infrastructure.”

Egypt’s LNG Profile

Egypt could not fully capitalize on its location and infrastructure, however, without a supportive regulatory framework. “It’s not possible to sell, buy, import and export production when the market is closed and doesn’t allow for people to freely trade,” Engineer Osama Mobarez, undersecretary for the technical office of the Ministry of Petroleum and Mineral Resources (MoP), says. “Therefore, one of the primary steps we took was to pass the new gas law.” The Natural Gas Act (Law 196 of 2017) allows the private sector to import gas; operate pipelines; and store, distribute and ship gas—all positions previously reserved for the government. It also established the Gas Regulatory Authority (GasReg) to grant licenses and oversee the use of the natural gas grid. The law essentially liberalized the market and made it more competitive.

Mobarez says there is a political component to consider as well: “We can’t do it on our own. The energy hub is not only related to petroleum but strategies, security, politics. Because of that, we’re working with all the different parties.” The European Union and the United States have both expressed support for Egypt’s energy hub initiative. Europe’s Mediterranean countries are interested because their most economically viable offshore natural gas projects involve sending the gas to Egypt for liquefaction and export to Europe and the world. Egypt’s emergence as a regional oil and gas hub will also help the EU diversify its sources for natural gas imports, which
is a matter of strategic importance.

Since 2018, the EU has been working with Egypt on multiple aspects of the energy sector, and in April 2019, the two parties signed a memorandum of understanding (MoU) involving technical assistance and capacity building for opening the Egyptian gas market. In July, the EU announced plans to provide EUR 20 million (USD 21.8 million) in funding for Egypt's natural gas sector.

Looking to increase Egypt’s energy investments, the petroleum minister and Minister of Electricity and Renewable Energy signed an MoU with the U.S. Secretary of Energy in July 2019 to streamline the exchange of technical information, consultancy services and technological transfer in the hydrocarbon field.

Promising future for the Eastern Mediterranean

The Mediterranean Sea holds some of the world’s largest natural gas deposits beneath the territorial waters of several countries. Major discoveries in the past decade—including the Zohr field in Egypt, Tamar and Leviathan in Israel, and Aphrodite in Cyprus—have pushed estimates of the region’s proven natural gas reserves to 8 trillion cubic meters (tcm) and created new opportunities for regional integration. As production in these fields comes online and enters the world market, the Eastern Mediterranean will be important for many years to come.

Between 2009 and 2011, the discovery of Tamar, Leviathan and Aphrodite promised to raise the Eastern Mediterranean’s profile in the global energy scene, but little progress was made in exploiting the new fields. Israel was slow to attract investment to its fields, while Cyprus saw estimates for Aphrodite’s reserves revised significantly downward. The discovery of Zohr by the Italian company Eni in 2015 signaled a reversal of fortune for the region and the beginning of regional cooperation to reap the benefits of the offshore fields.

As Simone Tagliapietra, research fellow at the economic think-tank Bruegel, wrote in a March 2019 Financial Times op-ed, “The significance of Zohr goes well beyond Egypt’s boundaries, as geographical proximity with the other fields off the shores of Israel and Cyprus would allow for coordinated development of the fields and thus, the creation of the economies of scale required in order to put in place a competitive regional gas-export infrastructure.”

There are ample opportunities for regional collaboration. For instance, Cyprus and Israel have small domestic markets and limited infrastructure for natural gas exports, while Egypt has a large market and ample infrastructure. “We’re in discussions with different companies that have made discoveries in Cyprus and Israel and we’re trying to get these countries’ gases to Egypt in order to re-export and re-utilize,” says Mobarez.

Noble Energy’s Essner says, “Egypt is a potential market for our gas from Israel and Cyprus, and we are pleased by the steps that Egypt’s leadership has taken to connect the larger Levantine Basin.”

The other export infrastructure serving the Mediterranean is almost all focused westward: the Medgaz Pipeline, which runs from Algeria to Spain; the Trans-Mediterranean Natural Gas Pipeline, from Algeria to Italy via Tunisia and Sicily; Maghreb-Europe, from Algeria to Portugal through Morocco and Spain; and the Greenstream Pipeline, which goes from Libya to Italy.

In January 2019, Egypt, Cyprus, Greece, Italy, Israel, Jordan and Palestine created the East Mediterranean Gas Forum (EMGF) to promote cooperation and coordinate activities in the regional market. While the first two meetings (in January and July) mostly focused on establishing objectives, rules and procedures for the organization, the July meeting attracted the U.S. Secretary of Energy and representatives from France, the EU and World Bank as observers. The third meeting is set for January 2020.
At A Glance: Eastern Mediterranean Gas Forum (EMGF)

- Create a regional gas market by securing supply and demand
- Optimize resource development and the cost of infrastructure
- Improve commercial relationships and competitive pricing
- Utilize existing and build new infrastructure

**Source:** BP Statistical Review of World Energy 2019; Knoema

*Data as of 2015
**No data available

**Natural Gas Reserves (tcf)**
- Egypt: 75.5
- Israel: 16.6
- Jordan*: 0.21
- Greece*: 0.4
- Cyprus**: 4.7
- Palestine**: 10.5

**Natural Gas Production and Consumption (bcm)**
- Production: 58.6
- Consumption: 59.6

* Egypt
* Jordan*
* Greece*
* Cyprus**
* Israel
* Palestine**

Source: BP Statistical Review of World Energy 2019; Knoema
Re-building gas trade ties

Zohr was not only a game changer for the region, but also for Egypt. Prior to 2011, Egypt was self-sufficient in natural gas and had active export agreements. But amid the political and economic turmoil following the 2011 Revolution, production dwindled and consumption rose, making Egypt unable to meet its export obligations. From 2011 until 2018, Egypt was a net importer of natural gas.

Production from Zohr and other offshore discoveries came online in 2017, and Egypt now derives 87% of its natural gas from the Mediterranean, with over 40 producing wells in the area. In September 2018, the country positioned itself to resume exporting natural gas. Currently, Egypt has import-export agreements with Jordan, Israel and Cyprus.

Jordan

Egypt and Jordan are connected through the AGP, which opened in 2001 as part of an integrated gas strategy between the two countries. Jordan imports Egyptian natural gas to fuel its power stations. Under a 2004 agreement, Egypt committed to exporting 250 million standard cubic feet per day (mmscf/d) at USD 2.5 per metric million British thermal units (mmBtu); the price was renegotiated eight years later to USD 5 per mmBtu. Jordan does not have significant petroleum reserves of its own, so when Egypt’s gas exports dried up in 2011, it hit the country hard. According to the Jordanian Ministry of Energy, the cut in gas supplies cost the Jordanian government around JOD 5 billion (roughly USD 7 billion).

In 2014, Egypt and Jordan signed a preliminary agreement to restart the flow of gas, but negotiations were put on hold because of limited Egyptian production. In July 2018, Egypt resumed exports with 50 mmscf/d; a month later, the countries amended their 2004 agreement to have Egypt supply around 50% of Jordan’s natural gas needs. The new contractual relationship is flexible, based on demand in both markets as well as Egypt’s surplus available to export.

In June 2019, exports dropped by 78.5% from March and were temporarily halted a month later due to lower demand from the Jordanian electricity producers. In September, however, Jordan resumed imports amid news that demand would increase: Egypt Gas and the Jordanian-Egyptian FAJR for Natural Gas Transport and Supply Company, which operates the AGP inside Jordan, signed a 12-year, USD 3.9 million contract to supply natural gas to Jordanian phosphate mines.

Egypt’s Natural Gas Exports to Jordan (2019, mmscf/d)

![Graph showing monthly exports of natural gas from Egypt to Jordan in 2019.]

Source: Media reports
Egypt Emerging as Regional Gas Hub

Israel

Cooperation began in 2005, when Egypt and Israel signed a 20-year agreement for Egypt to export up to 6.9 bcm (247.2 bcf) of natural gas, covering about 40% of Israel’s yearly demand. As with the case with Jordan, those exports were cut off in 2011. Unlike Jordan, however, Israel has substantial reserves to exploit, so as Egyptian imports were declining, Israel was increasing its own natural gas production. In March 2013, production began in the Tamar field, alongside development in the Leviathan and Karish/Tanin fields. Tamar’s output alone allowed Israel to achieve self-sufficiency in natural gas, which has allowed the country to plan for exports.

In February 2018, Egypt’s Dolphinus Holding, U.S.-based Noble Energy Inc. and Israel’s Delek Drilling announced a USD 15 billion deal for Dolphinus to import 64 bcm (2.3 tcf) of gas over a decade from Noble and Delek, which both have stakes in the Tamar and Leviathan fields. In September 2018, Noble Energy, Delek Drilling, and Egypt East Gas Company agreed to purchase a 39% stake in the East Mediterranean Gas Company, owner of the EMG Pipeline. The stake sale was completed in November 2019, giving the consortium access to the pipeline for transferring natural gas from Tamar and Leviathan to Egypt’s two LNG plants. The consortium paid USD 518 million for the stake, with Delek and Noble each providing USD 185 million and EEG covering the remainder.

In November, Delek Drilling announced that gas exports from Leviathan to Egypt are expected to begin by early 2020, instead of in June 2019 as was originally planned. Delek attributed the delay to an increase in local demand for natural gas and fears that there would be a shortage from the Tamar field. Egyptian and Israeli media reports have also attributed the delay to infrastructure repairs, pending regulatory approvals and security concerns.

Cyprus

In September 2018, Egypt signed an agreement to build a subsea pipeline connecting Aphrodite with Egyptian LNG facilities, with a capacity of 700 mmscf per year. After processing, the Cypriot gas will be re-exported to global markets, particularly to the EU. The agreement came into effect in July 2019 after being approved by Egypt’s parliament and president.

The first gas from Aphrodite to Egypt will flow in 2024 at the earliest, with total revenues from the project estimated at more than USD 9 billion. There were discussions about sending Cypriot gas from Aphrodite via Zohr’s offshore facilities, but Zohr’s current infrastructure does not have the capacity to handle the additional supply. This situation could potentially change with Eni’s discovery of the Calypso field in Cyprus. Depending on the size of the reserves, Eni and other international oil companies working in the area could explore the commercial viability of expanding the offshore infrastructure.
Supergiant Zohr: Largest Gas Field in the Mediterranean

Largest deposit in the Mediterranean and 20th worldwide

Recoverable reserves: **30 trillion** cubic feet (tcf)

Production: **3 billion** cubic feet per day (bcf/d)

8x higher production in Aug 2019 compared to Dec 2017

Total investments to date: **USD 10.6 billion** (August 2019)

Production targeted to exceed 3 bcf/d

Production reaches 2.7 bcf/d, five months ahead of schedule

Production hits 2 bcf/d, one year ahead of the development schedule

Production starts at 350 million cubic feet per day (mcf/d)

Zohr field discovered by Eni within the offshore Shorouk Block (190 km north of Port Said)

80% of the project has been implemented by Egyptian companies

40% of Egypt’s total natural gas production

Investments by Company

Sources: Ministry of Petroleum; Standard Chartered Bank; The Economist; Rosneft and Eni
During the diagnostic phase of the Oil & Gas Modernization Project (OGMP), one of the key areas earmarked for reform was human resource (HR) management. “We won’t be able to do anything we are suggesting without a motivated and competent labor force,” says Engineer Osama Mobarez, undersecretary for the technical office of the Ministry of Petroleum and Mineral Resources (MoP).
As of 2018, there were 818,788 people working in the public sector, 240,000 of whom are working in the oil and gas sector. Under the petroleum ministry’s umbrella are the five main holding companies—Egyptian General Petroleum Corporation (EGPC), Egyptian Natural Gas Holding Company (EGAS), Egyptian Petrochemicals Holding Company (ECHEM), Ganoub El-Wadi Holding Company (GANOPE), and Egyptian Mineral Resources Authority (EMRA)—which oversee around 145 companies.

Public sector oil and gas companies have long suffered from misallocation of human capital, overstaffed with underqualified employees who cannot be fired. “So since I could not lay them off, I could at least rehabilitate them,” Mobarez says, “and give them customized training that can best utilize their attributes and place them in a different area of work.”

Other HR-related problems included a shortage of talented individuals and management potentials, as well as a lack of a performance management system with a competitive structure and incentive schemes. The shortcomings were significant enough to make HR management a pillar of the OGMP, with a goal of ensuring that hiring is based on competency, with the right people assigned to positions best suited for their skills. Beyond the initial placement, the ministry wants to create an environment where talent is identified and cultivated to the benefit of the company and the individual’s career.

Under the HR pillar, one of the main areas of focus is systemic, including HR systems, policies and procedures. Among the systemic reforms, the MoP is creating an employee database and a new performance management system (PMS) for use by all companies under the ministry. Other reforms include conducting a SWOT analysis for HR and modernizing the joint venture (JV) model with a specific focus on HR and governance.

Another focus is personnel, concentrating on developing the skills and competencies of the employees. This involves creating competency-based development plans for career progression in every position, implementing HR best practices including transparency and equal opportunity policies, and offering training opportunities at every rung of the career ladder.

Ministry of Petroleum Structure

Some 240,000 ministry employees are affected by the HR management reforms.
Understanding the workforce

For a comprehensive understanding of the human resources available within the MoP’s network of companies, the ministry has developed a unified HR database for all 240,000 employees in the system. The first step involves creating the basic record for each employee with name, occupation and company. According to Mobarez, the second phase will expand each record to include the individual’s competencies, strengths and weaknesses, and personality profile.

The database will also update job descriptions to include performance measurements and requirements for each position. Meanwhile, the new PMS will standardize the criteria for evaluation and selection and help identify talents and competencies. Taken together, the database and PMS will help managers match the right employee to the right job to fulfill the respective company’s mission.

Mobarez says the ministry is also “looking to have a Center of Excellence so that the assessment factor is embedded in the system, not only for leaders but from the recruitment stage.” This way, he adds, each employee “enters the career path knowing what they’re doing and how their future is going to look, or at least their leader knows their career path.”

Developing the workforce

The key to better utilization of human capital and HR development is training. In 2005, six public-sector petroleum companies—EGPC, Egyptian Natural Gas Company (GASCO), Enppi, Petrojet, ECHEM and EGAS—set up Oil & Gas Skills (OGS), a dedicated training company to design and implement capacity building programs across the value chain. Other local companies that provide oil and gas industry training services include the Enppi Academy and the Arab Consulting and Development Corporation (ACAD).

One of the major ministry-led training initiatives is the Zohr Development Program, which since August 2017 has provided nearly 288,000 training hours to more than 35,000 participants.

The ministry has also been collaborating with the private sector to train staff in public sector companies. One of the first programs to be set up as part of the OGMP’s HR pillar is the Middle Management Development Program (MMDP), which launched in December 2017 to identify and develop talented young employees to become the next generation of leaders, able to cope with rapid transformations in the sector. “Besides the challenge of overstaffing, another challenge is that there is a big gap between the leaders and the level [beneath] them,” Mobarez explains. To close this gap, the ministry has partnered with IOCs to teach the MMDP’s practicum-based curriculum, including ExxonMobil, Halliburton, Schlumberger, Apache and others.

MMDP participants are selected after an intense evaluation that includes psychometric tests, essays and assessments similar to those used by top business and management schools. Thus far, there have been 450 successful candidates, who are assigned to one of three sections: fast-track, management and technical. Fast-track is for those with very good leadership skills who could advance quickly to top positions, while the other two sections support long-term development of administrative and technical managers.
Halliburton took on a class of MMDP students in August. Colby Fuser, Halliburton’s vice president - Egypt and Libya, explains, “Phase two will take some of the successful individuals from Egypt to work on oil and gas projects in the U.S. In the end, these highly skilled individuals will have a more well-rounded knowledge of oil and gas processes and technologies, which can be used to advance the work they do in Egypt. This experience, which also focuses on leadership skills, will improve human capital development and enable stronger mentoring for future Egyptian generations.”

In addition to developing middle managers, the MoP wants to create career development programs for all job levels, including the new hires. The ministry is working with Schlumberger on a three-month program teaching technical and soft skills for entry-level employees.

As part of its leadership development plans, the petroleum ministry has also sought out customized training. “Apache Egypt worked closely with the MoP to tailor a program that advances the high potential (HiPo) candidates’ experiences on human resource matters, decision processes, business acumen, [health, safety and environment (HSE)] advocacy and managerial practices,” says Mark Avery, Apache’s senior manager international HR & administration. “We selected a diverse, small cross-section of individuals from several Egyptian government companies to join Apache for six months to learn more about Apache’s Operational Excellence focus. The selected trainees will have a chance to work abroad, embedded directly in Apache’s work effort, and routinely report back to the MoP on their findings and experiences.”

“In my view, it is all about people when it comes to driving real improvement and shaping a new business culture. As such, learning and development of people is critical to the success of the overall strategy,” says Hesham ElAmroussy, chairman and managing director of ExxonMobil Egypt. “ExxonMobil Egypt has been actively engaged and closely collaborating with the Ministry of Petroleum, based on our belief that the ultimate goal of modernization can only be reached by sincere efforts exerted jointly by the government and the private sector. We’ve sponsored a number of leadership programs aimed at the development of the MMDP. Moreover, as chairman of the American Chamber of Commerce’s Oil and Gas Committee, I’ve supported the modernization efforts at large and the capacity building objectives in particular.”
The Human Element

Special focus on safety

Many aspects of work in the oil and gas sector involve risk to an employee and to the environment itself, making HSE management a critical part of any company’s mission. In January 2019, the MoP teamed up with multiple IOCs to launch a USD 1 million HSE Capacity Building Program, which prepares employees to lead the sector toward higher efficiency in a safe and environment-friendly way. The program has developed a strategic roadmap to standardize HSE tools, processes and practices, and will evaluate HSE professionals to identify future agents of change.

“HSE is a key component of the Modernization Program training. Our path of Journey to Zero is to achieve zero safety incidents, environmental incidents and non-productive time every day on every job. One element of this strategy includes training and competency for employees and the Modernization program members,” Halliburton’s Fuser says. “We have the “Halliburton 9 Life Rules”, which are used in all our businesses and operations and [are] now rolled out as an industry standard in Egypt. The rules are a set of nine core factors that affect personal safety based on our HSE standards. It is imperative employees learn all nine so they become second nature and are a regular part of our safety dialogue. We aim to exceed expectations of regulators, customers and even our own internal standards. In addition to HSE compliance, we are committed to continuous improvement across all areas.”

After a series of assessments, 74 out of 172 applicants already working in the HSE departments at state-owned companies were accepted to the pilot program, bringing with them an average of 12 years

### IOC Training Partnerships with the MoP

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<tr>
<th>IOC</th>
<th>Partners</th>
<th>Program description</th>
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<td>MoP and the American Chamber of Commerce in Egypt (AmCham Egypt)</td>
<td>Develop and implement a leadership training program for MoP employees, to include practical training by Apache experts.</td>
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<td>Baker Hughes, a General Electric Company (BHGE)</td>
<td>MoP</td>
<td>Train the professionals who will be managing the Upstream Gateway project</td>
<td>February 2018</td>
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<td>ExxonMobil Apache Egypt Schlumberger</td>
<td>MoP and AmCham Egypt</td>
<td>Train 50 MoP mid-level managers in change management</td>
<td>February 2019</td>
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<tr>
<td>Halliburton</td>
<td>MoP</td>
<td>Customize a six-month development program for mid-level managers and young professionals that provides on-the-job training in various sections of the company inside and outside Egypt.</td>
<td>July 2019</td>
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</table>

Sources: Media reports
of experience in engineering, science and other relevant disciplines. The first phase of the program ended in May 2019, with a second phase starting immediately afterward.

Preparing the next generation

With exploration and production opportunities and investments growing in Egypt, the IOCs need a skilled workforce just as much as the MoP does. The expertise they bring to their partnerships with the ministry comes from long experience developing their own human resources.

Baker Hughes, a GE Company (BHGE) has a number of training programs for both youth and prospective leaders, including “the Field Engineer Program, which is focused on building technical, in-the-field and hands-on capabilities for engineers,” says Hussam Abuseif, BHGE’s director & general manager for Egypt and Sudan. “We also have the ASPIRE program, which focuses on building future finance, HR and commercial leaders to serve the sector. All of our programs are rotation-based and give young talent exposure to a number of markets, and develop full-rounded leaders for the future.”

ExxonMobil Egypt has been focusing on the next generation of petroleum employees by supporting programs at schools and universities, including a science, technology, engineering and mathematics (STEM) school in Suez, which encourages and develops talented, creative students to enter fields needed by the sector.

Industry experts say one of their biggest HR challenges is retaining talent. BHGE’s Abuseif notes, “Today, with the growth the market is witnessing, the job market is also getting competitive. For companies to retain strong talent, there is a need to work hard on creating challenging and attractive opportunities that match the skill sets and demands of the new generation.”

In addition to competition, Apache’s Avery says the industry must find ways to cope with the retirement of its most experienced workers. The Society of Petroleum Engineers estimates that nearly 50% of skilled workers will be eligible for retirement within the next seven years. “This has and will continue to create skill gaps in the industry,” Avery notes. “However, this will create significant opportunities for workers in the industry. Retaining talented HiPo employees in an industry experiencing a talent gap, combined with a generation of workers expecting to be provided rapid development opportunities, is without a doubt a challenge.”
**SWOT Analysis**

**Strengths**
- Implementation of the Oil and Gas Modernization Project
- Petroleum price liberalization
- Acceleration in oil and gas discoveries
- High level of proven reserves
- Gas market liberalization (pricing and establishing GasReg)
- Largest infrastructure in East Mediterranean
- Largest non-OPEC oil producer
- Second-largest natural gas producer
- Largest oil refining capacity in Africa
- Major transit route for petroleum trade
- Competitive labor and production costs

**Weaknesses**
- Poor maintenance of aging petroleum facilities
- Production inefficiencies
- Large petroleum consumption levels
- High level of political involvement in the sector
- Absence of clear KPIs

**Opportunities**
- Around 50 IOCs operating in upstream development
- High potential to become the Energy Hub for the East Mediterranean with regional energy integration
- Technical and financial cooperation with international communities including the EBRD, EU, World Bank and African Union
- Potential for offshore oilfields attracting large international attention
- Enhancing under-utilized natural gas infrastructure
- Undiscovered areas
- Unconventional reserves
- Paying back arrears owed to IOCs
- Sanctioning of midstream project to help transport oil and gas
- Expansion and upgrade of oil refineries

**Threats**
- Political unrest/turmoil in the Middle East
- Global economic slowdown
- Fluctuating international oil prices
- Competition from new market entrants
- Financial liabilities
- Competition from other countries if they develop their own infrastructure
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