EGYPT'S NATURAL GAS EXPLORATION AND DRILLING ACTIVITIES:

A COMPARATIVE ANALYSIS FOR FYs 2016/17 & 2017/18

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Egypt is a mature hydrocarbon producer, which has been performing Exploration and Production (E&P) activities for more than a century. In addition, Egypt is currently a significant natural gas producer in the African continent that is on its way to becoming a regional hub for natural gas.

The exploration activities in the 1960's resulted in the discovery of Abu Madi field, the first natural gas discovery in the country's history, in the Nile Delta. The field was discovered by Petrobel in 1967, in which four wells were drilled and put on stream later on in 1977. In 1969, the exploration and drilling activities in the Mediterranean Sea resulted in discovering Abu Qir field the first natural gas discovery in the area, according to the Ministry of Petroleum and Mineral Resources' (MoP) website.

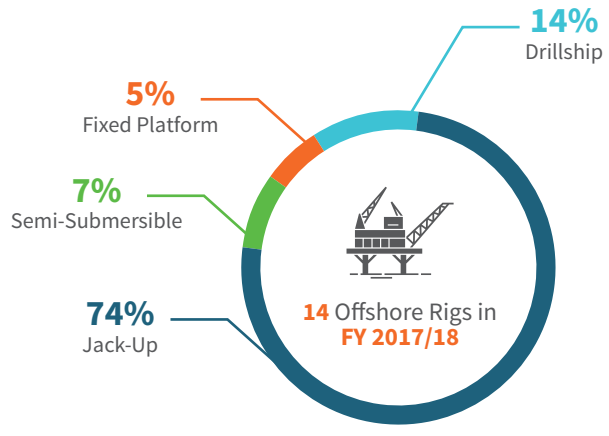
These discoveries encouraged the spread of exploration and drilling activities both onshore and offshore, reaching the offshore Mediterranean deep water that was initially explored in 1975.

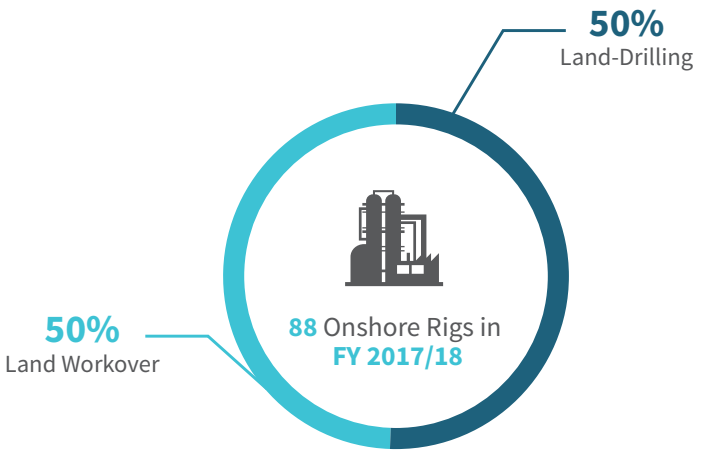
The MoP has continuous efforts to support exploration activities, including conducting expanded seismic surveys, offering international bid rounds and encouraging the international oil companies (IOCs) to invest in upstream activities.

DRILLING RIGS

Egypt has two main types of rigs: offshore and onshore rigs. The offshore rigs in Egypt are classified into two main types: (i) moveable offshore drilling rigs, as jack-up, semi-submersible, and drillship rigs, and (ii) fixed rigs/platforms. Such rigs are often located in the Gulf of Suez, the Mediterranean Sea, and the Nile Delta regions. Additionally, Egypt also has two types of onshore rigs: land-drilling and land work-over rigs. These are mainly located in the Eastern Desert, the Western Desert, and Sinai.

In Fiscal Year (FY) 2016/17, 148 rigs contributed in the drilling, repairing and workover operations, of which 15 were offshore, 67 were onshore, and 66 were standby rigs. While in FY 2017/18, the number of rigs counted for 147, divided into 14 offshore rigs and 88 onshore rigs, in addition to 45 standby rigs, according to the Egyptian Natural Gas Holding Company (EGAS) Annual Reports FYs 2016/17 & 2017/18.





Over the past few years, exploration and drilling activities in the Western Desert witnessed a boom thanks to having large crude oil and natural gas reserves. In both FYs 2016/17 and 2017/18, the Western Desert attained the highest number of drilling rigs within the region. The number of rigs within the region increased from 46 rigs in FY 2016/17 to 65 rigs in FY 2017/18, as stated in EGAS Annual Reports FYs 2016/17 & 2017/18.

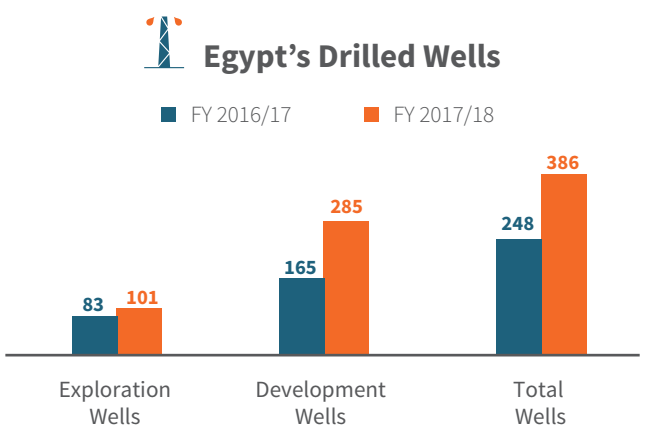
In **FY 2017/18**, the Western Desert possessed **64%** of Egypt's total rigs.

TOTAL DRILLED WELLS IN EGYPT

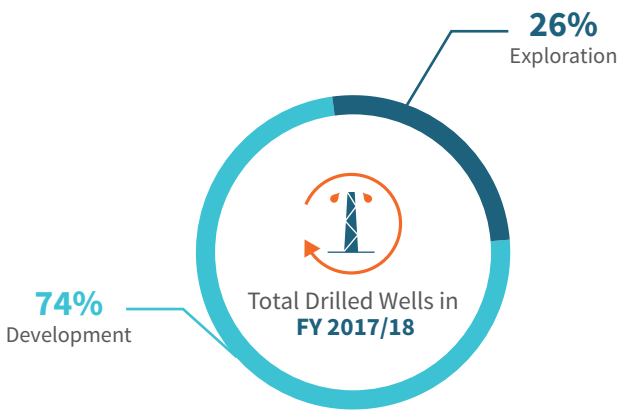
Drilled wells could be identified as either exploration wells or development wells. The two types increased separately in numbers in the two FYs 2016/17 and 2017/18. Exploration wells are drilled for exploration purposes in new areas, while development or production wells are drilled for crude oil or natural gas production in fields with proven reserves, according to the Egyptian General Petroleum Corporation (EGPC).

Approximately 101 exploration wells were drilled in FY 2017/18, with a 21.7% annual growth rate. Over the same period, the development drilled wells significantly increased by 72.73% to reach 285 wells, according to EGPC's data.

EGPC's data further showed that the of drilled wells in Egypt witnessed an increasing trend over the two FYs 2016/17 and 2017/18. The number of wells in FY 2017/18 increased by 55.65% to 386 wells, compared to that in FY 2016/17.



It is worth noting that exploration wells' share in the total drilled wells decreased from 33% in FY 2016/17 to 26% in FY 2017/18. On the other hand, a significant portion of the total drilled wells that were development wells, had shares that reached 74% in FY 2017/18 up from 67% in FY 2016/17, according to EGPC.

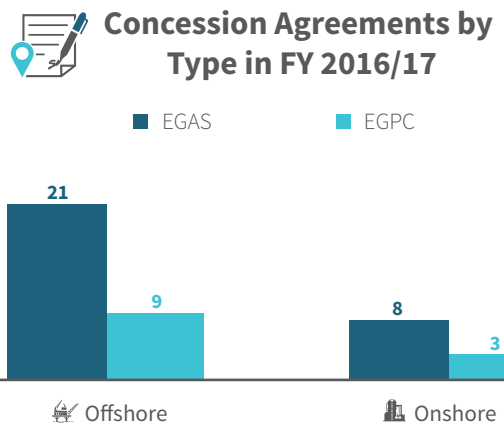


AGREEMENTS AND DEVELOPMENT LEASES

Concession agreements in natural gas activities are either signed between IOCs and EGAS, or between IOCs and EGPC under the supervision of EGAS.

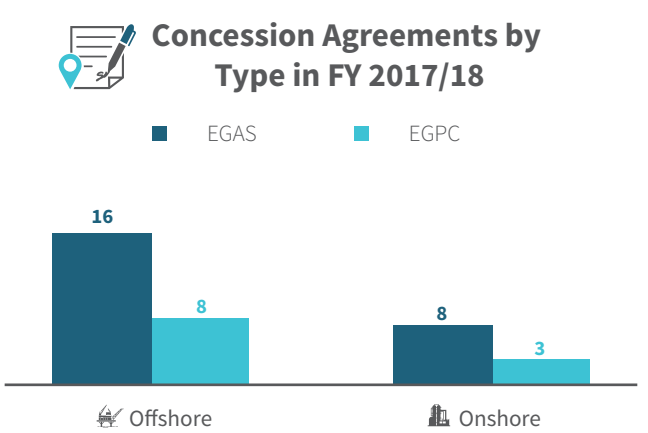
In FY 2016/17, there were 41 concession agreements valid to the end of June 2017. EGAS signed 29 agreements with IOCs, of which 21 were offshore concessions and eight were onshore ones. On the other hand, EGPC signed 12 agreements under the supervision of EGAS, which were mainly offshore concessions, according to EGAS Annual Report FY 2016/17.

Four exploration agreements of the 41 active agreements were newly signed in FY 2016/17. The four agreements are maintained to drill eight exploratory wells with financial commitment of $306.15 million. In addition, the signature bonuses reached $10.5 million, stated in EGAS Annual Report FY 2016/17.



Additionally, four development leases, in the Mediterranean Sea concessions, were signed. The total reserves from the four leases estimated at 3.5 trillion cubic feet (tcf) of natural gas and 49 million barrels (mmbbl) of condensates, explained in EGAS Annual Report FY 2016/17. The investments spent in these development leases recorded $1.55 million, while the development bonuses reached $5.1 million.

In FY 2017/18, 35 concession agreements were signed. EGAS signed 24 concession agreements with IOCs, of which 16 were in offshore concessions, while eight were in onshore concessions. Of EGAS's agreements, 13 agreements were in exploration phase and 11 were in development phases, according to EGAS Annual Report FY 2017/18.



In addition, EGPC, under EGAS's supervision, signed 11 concession agreement, all of which were in development phases. Eight agreements of EGPC's were offshore and three were onshore agreements.

EGAS announced its international bid round in May 2018. The company offered a total of 16 blocks in the bid round, including 13 blocks in the Mediterranean Sea and three blocks in the Nile Delta, according to EGAS's website.

The results of the bid round were announced in February 2019, on the sidelines of the Egypt Petroleum Show (EGYPS 2019). The bid round resulted in awarding five blocks in the two regions, according to the MoP's website.

The bid round witnessed the entrance of Exxon Mobil in the Egyptian upstream activities for the first time. The other four blocks were awarded to Shell/ Petronas, Wintershall DEA, and IEOC/BP, according to the MoP's website.

EGAS Bid Round Results in February 2019

Block	Concession	Awarded Company	Financial Commitment	Drilled Wells	Signature Bonus
3	North East El Amriya Offshore	Exxon Mobil	$ 220 million	4	$10 million
4	North Sidi Gaber Offshore	Shell/ Petronas	$180 million	3	$10 million
6	North El Fanar Offshore	Shell/ Petronas	$ 129 million	2	$3 million
10	East Damanhur Onshore	Wintershall Dea	$43 million	8	$11 million
11	West Sherbean Onshore	IEOC/BP	$28 million	4	$5 million

MAIN NATURAL GAS EXPLORATION ACTIVITIES

The Mediterranean Sea and the Nile Delta regions are two of the most promising areas of producing natural gas in Egypt. In FY 2016/17, the two regions witnessed drilling of 13 exploratory and appraisal wells, resulting in four discoveries, three successful wells as well as six dry wells with success rate of 54%, according to EGAS Annual Reports FYs 2016/17 & 2017/18.

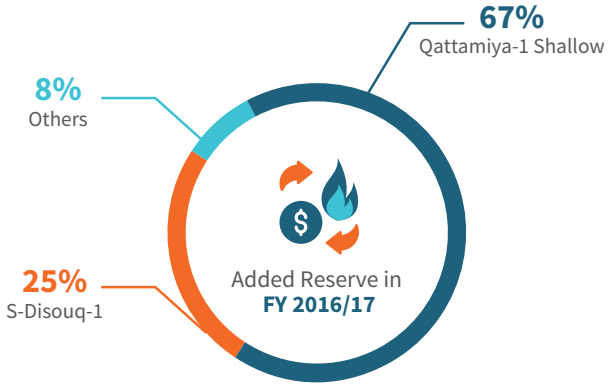
Exploration and Drilling Activities Results in FY 2016/17

Area	Company	Successful Wells / Dry Wells
Salamat Dev.	Pharaonic	W. Salamat-1
Tao Dev.	Nospco	Tao-5 ST
Zohr Dev.	Petrobel	Zohr-5
Zohr Development	Petrobel	Zohr Deep-1
S. Idku Onshore	Edison	S. idku-1
S. Al Khlila Dev.	El Mansoura	S. Al Khilala-3
El Manzala Dev.	El Wastani	Anas-1
El Matariya Onshore	BP	Mocha-1
El Matariya Onshore	BP	W. Ward Delta-2

Four Discoveries in the Med. Sea and the Nile Delta

Area	Company	Wells
N. Damietta Offshore	BP	Qattamiya-1 Shallow
Balsam Dev.	El Wastani	Balsam-6
S. Disouq	Sea Dragon	S-Disouq-1
W. El Qantara Dev.	El Wastani	Bronia-1

Of the four discoveries, one in the Mediterranean Sea and three in the Nile Delta region, added reserves of about 188.63 billion standard cubic feet (bscf) of natural gas and 2.91 mmbbl of condensate.



Katameya Shallow-1 is a major discovery, in the Mediterranean Sea, in Pliocene formation. The discovery's added reserve is about 126 bscf of natural gas. On the other hand, South Disouq-1 is considered one of the significant discoveries in the Nile Delta region. It added reserve of about 47.13 bscf of natural gas. Besides, the discovery added 2.9 mmbbl of condensate.

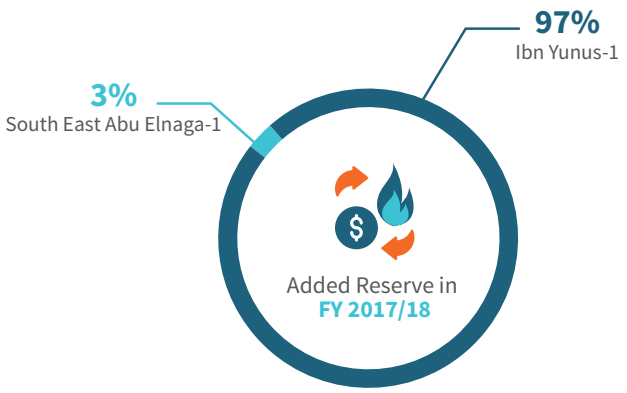
In FY 2017/18, the Nile Delta region witnessed the same number of drilled exploratory and appraisal wells. However, it resulted in two natural gas discoveries, in addition to eight successful wells and three dry wells, with success rate of 77%.

Exploration and Drilling Activities Results in FY 2017/18

Area	Company	Successful Wells / Dry Wells
Zohr Dev.	Petrobel	Zohr-8
Zohr Dev.	Petrobel	Zohr-10
Zohr Dev.	Petrobel	Zohr-11
WDDM	Rashpetco	Sapphir SE-1
North El Mahala	Total	Tarif Deep-1 T-1
South Disouq	Sea Dragon	South Disouq-4
El Manzala	Wasco	South Abu Elnaga-9
El Matariya	BP	Nafahat West-1
El Matariya	BP	Khairat DT-1
South Disouq	Sea Dragon	Kelvin-1

Ibn Yunus-1 and South East Abu Elnaga-1 both added reserve of about 53.28 bscf, decreasing by 71% in comparison to that added by the four discoveries in FY 2016/17. Moreover, the two discoveries contributed by 0.859 mmbbl of condensate.

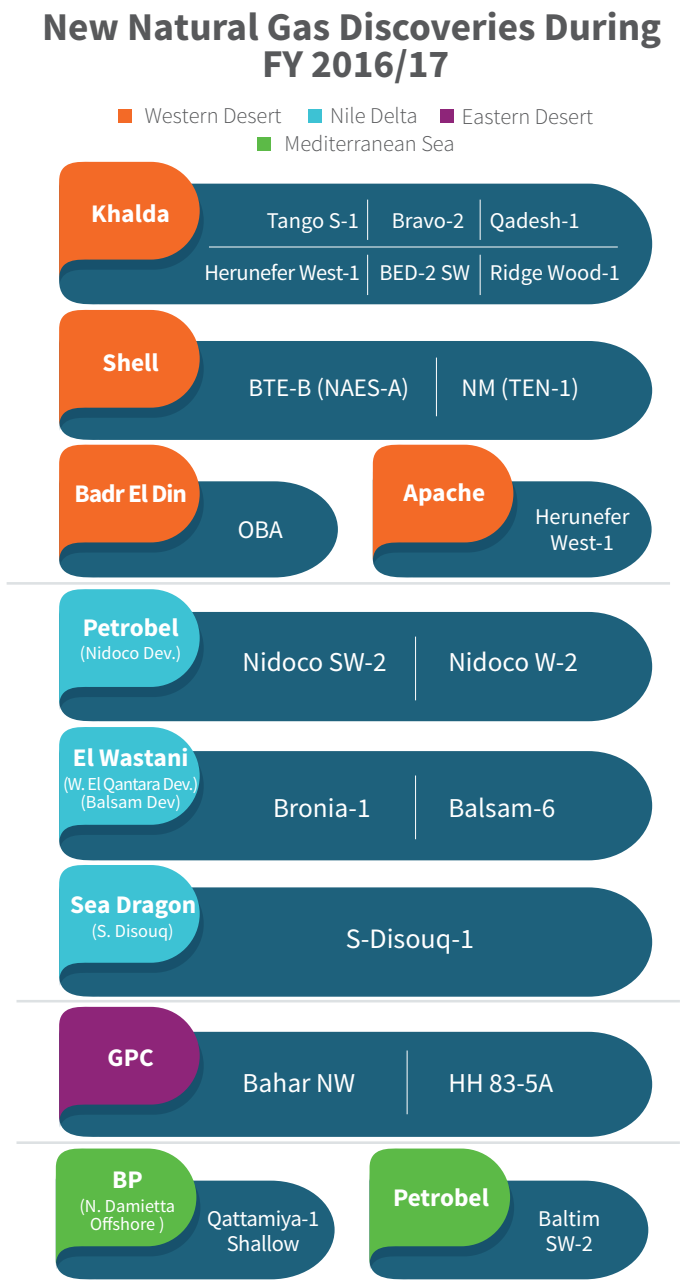
Ibn Yunus-1 is a considerable discovery in the Nile Delta region that added reserve of about 51.9 bscf of natural gas. Furthermore, its condensate reserve count to 0.756 mmbbl. On the contrary, South East Abu Elnaga-1 is a minor discovery that added reserve of 1.38 bscf of natural gas. In addition, it contributed by a humble reserve of condensate of 0.103 mmbbl.



Two Discoveries in Nile Delta

Area	Company	Wells
South Disouq	Sea Dragon	Ibn Yunus-1
North El Salhiya	Dana Gas	South East Abu Elnaga-1

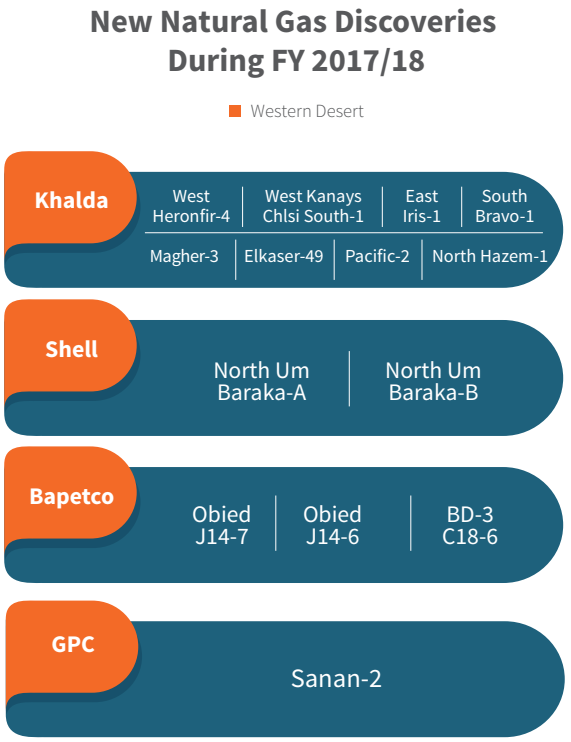
Main Natural Gas Discoveries



In FY 2016/17, 19 new natural gas fields were discovered of which two were in Mediterranean Sea: five in Nile Delta, ten in the Western Desert and two in the Eastern Desert. These new discoveries added reserve of about 2,008.3 bscf of natural gas and 19.55 mmbbl of condensate within the four regions.

During FY 2017/18, 16 new natural gas discoveries were achieved; two in the Nile Delta and 14 in Western Desert. These new discoveries put reserves of about 182.952 bscf of natural gas within the two regions.

Natural Gas Regional Projects



During FY 2017/18, the West Mediterranean area saw the implementation of the West Mediterranean project. The project targeted attracting major IOCs such as ExxonMobil, Statoil, and Chevron to operate in the region. The project cost $153 million to cover seismic surveys, processing and reprocessing of data, geological, and geophysical interpretation as well as marketing, training, and conferences.

Successful explorations and drilling in Egypt indicate a brighter future, over the coming years. Hence, many companies are working on enhancing their drilling activities and further explorations in Egypt. For instance, Khalda Petroleum Company drilled 43 development wells, including 36 oil producing wells and four natural gas producing wells during Q1 FY 2019/20, according to a ministerial press released on September 1, 2019. Italy's Eni started drilling two wells in the southern culmination of Zohr field, in addition to the 10 wells drilled in the northern culmination in August 2019, according to Eni's website.

Qarun Petroleum Company announced that the company will drill 25 development wells and 10 exploratory wells during the current FY 2019/20 . The company added that it plans to produce 41,000 barrels per day (b/d), as stated by the company's chairman, Ashraf Abdel Gawad, in a ministerial press release on February 10, 2019. Moreover, Petrobel plans to drill 10 development wells with a crude oil production rate of around 3,000 b/d, Petrobel Chairman Atef Hassan stated, in a ministerial press released on July 4, 2019.

Furthermore, the MoP is seeking to drill two wells in Atoll and Katameya fields with around $ 289 million investments, by the end of 2019, as mentioned in a ministerial press release, on September 27, 2019. The joint activities and plans between the private companies and the ministry will create more cooperation and integration between different players in the market. Through reaping the benefits of different projects, discoveries, and activities in concessions and leases, the Egyptian petroleum sector will be able to perform much better in the future.