

PURSUING EGYPT'S PETROLEUM PRODUCTION OVER FY (2010/11-2018/19)

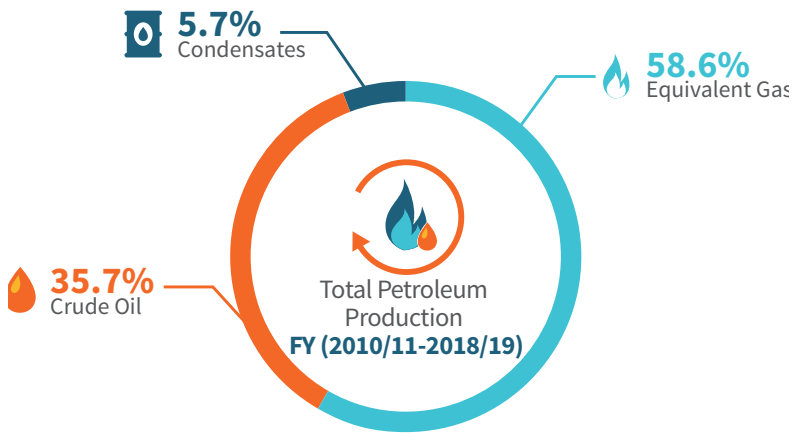
BY **AMINA HUSSIEN, REHAM GAMAL AND TASNEEM MADI**

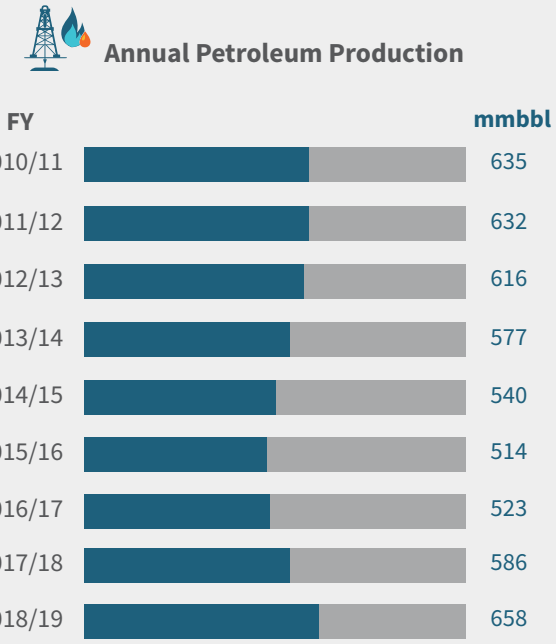
Egypt is a hydrocarbon production pioneer, as it is one of the oldest energy producers in the Middle East and North Africa (MENA) region. Having first pumped crude oil in 1910, Egypt has now become the largest crude oil producer in the African continent that is not part of the Organization of the Petroleum Exporting Countries (OPEC), according to the Energy Information Administration's (EIA) Country Analysis Brief: Egypt 2018. In addition, the African country is also an active member of the Organization of Arab Petroleum Exporting Countries (OAPEC) since 1973.

As Egypt is known for its significant natural gas discoveries, equivalent gas represents the largest production in the oil and gas sector in Egypt. In fact, in terms of petroleum production in Egypt, natural gas represents 58.6% of the total petroleum production, while crude oil represents 35.7%, and condensates 5.7%, according to the data by Egyptian General Petroleum Corporation (EGPC) and the Egyptian Natural Gas Holding Company (EGAS).

PETROLEUM PRODUCTION OVER FY (2010/11-2018/19)

The Egyptian petroleum production from Fiscal Year (FY) (2010/11- 2018/19) reached a total of 5,282 million barrels (mmbbl). This production reached its peak in FY 2018/19, with approximately 658 mmbbl. On the other hand, production reached its lowest level of 514 mmbbl in FY 2015/16, which was mainly a result of the decrease in natural gas production levels the same year, according to the data by EGPC and EGAS.





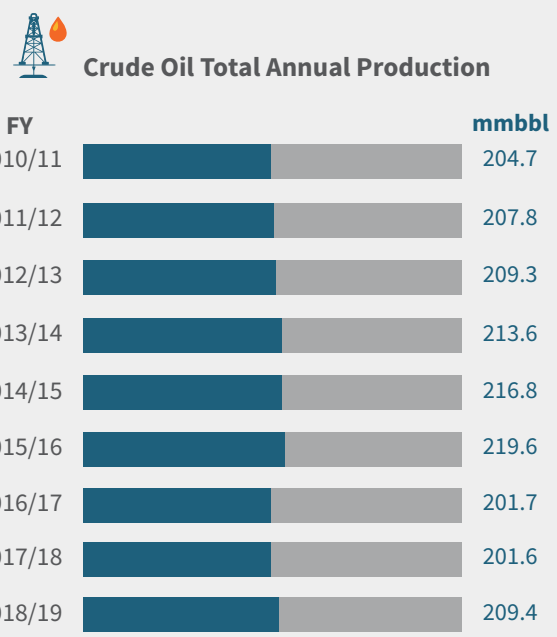
CRUDE OIL PRODUCTION

Egypt has a long history as an oil-producing country. Exploration first started in 1860, which led to the country's first crude discovery, the Gemsa field, nearly around 140 years ago, according to the Ministry of Petroleum and Mineral Resources' (MoP) official website.

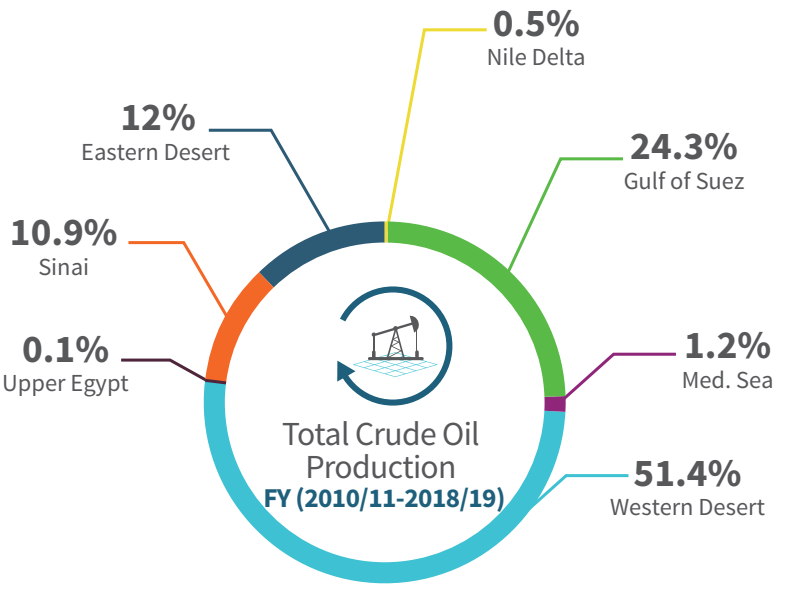
Over the period from FY 2010/11-2018/19, the total crude oil production recorded 1,884.6 mmbbl, according to EGPC's data. Egypt's crude oil production is further supported by the developed infrastructure, low production costs and relatively large volumes of both onshore and offshore fields.

On average, Egypt produces 209.4 mmbbl annually. In fact, FY 2015/16 recorded the highest level of production over FY 2010/11-2018/19, with 219.6 mmbbl. On the other hand, the lowest production level was recorded in FY 2017/18, with 201.6 mmbbl.

The remarkable decline in the production between FY 2015/16-2017/18, with 8.2%, stemmed from a combination of factors: the decrease of atmospheric pressure, the increase of sand movement and the increase of water produced from the wells, which is caused by an aging reservoir, as stated by the Ministry of Planning, Monitoring, and Administrative Reform's (MPMAR) annual reports. A report by EGPC also explained that the delay of development projects hampered the output.



The Western Desert and the Gulf of Suez have the lion's share in the Egyptian crude oil production, while the remainder comes from the Eastern Desert and Sinai. Additionally, the Mediterranean, the Nile Delta, and Upper Egypt combined do not exceed 2% of country's total annual production.



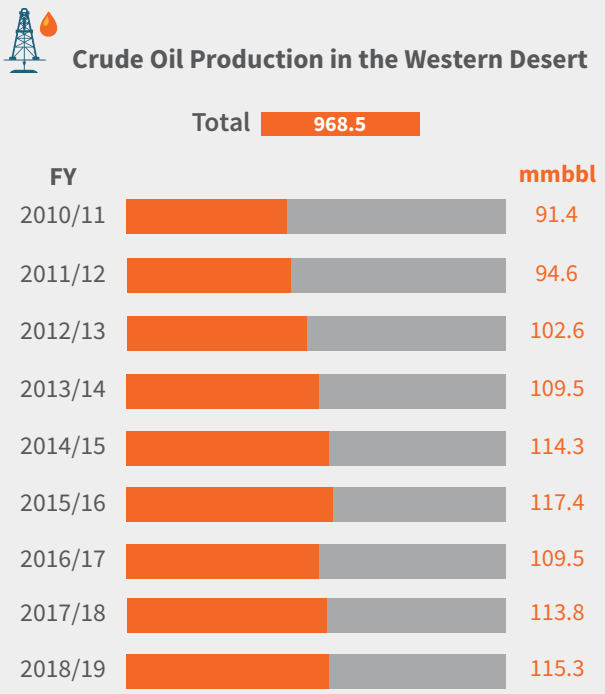
THE WESTERN DESERT

The Western Desert's crude oil production recorded an annual average of 107.6 mmbbl and represented 51.4% of the country's total crude production over the stated nine-year-period, according to EGPC's data.

The Western Desert covers approximately 67% of Egypt's total area, which is about one million square miles. The coastal basins of Matruh, Shushan, Alamein, and Natrun are located in the northern half of the Western Desert.

IOCs are paying more attention to the promising potential of the Western Desert. In the past few years, the Western Desert witnessed a series of major oil discoveries, including new fields in Faghur, Shushan, Alamein, and Matruh basins.

Over the course of the past nine FYs, the Western Desert produced a total of 968.5 mmbbl of crude oil. The crude production from the region hit a peak of 117.4 mmbbl in FY 2015/16, while the lowest level was 91.4 mmbbl in FY 2010/11, according to EGPC's data.



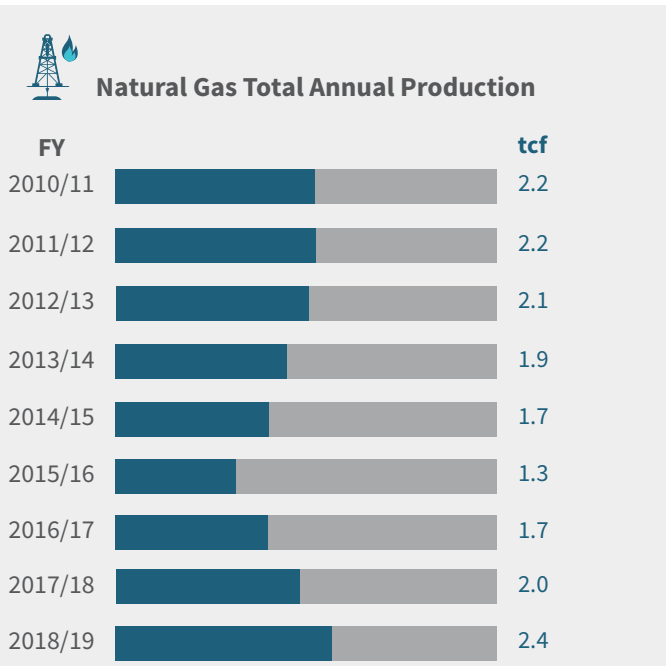
NATURAL GAS PRODUCTION

Natural gas exploration activities started in the early 60's when a number of natural gas discoveries were made mainly in the Mediterranean, the Western Desert, and the Nile Delta. In 1967, Abu Madi was marked as the first natural gas field discovered onshore the northeastern portion of the Nile Delta Cone. This was followed by an outstanding number of discoveries that contributed to boosting the production rates of natural gas.

Over the referred period, the Egyptian natural gas production recorded 17.6 trillion cubic feet (tcf), producing on average 1.96 tcf annually. The production

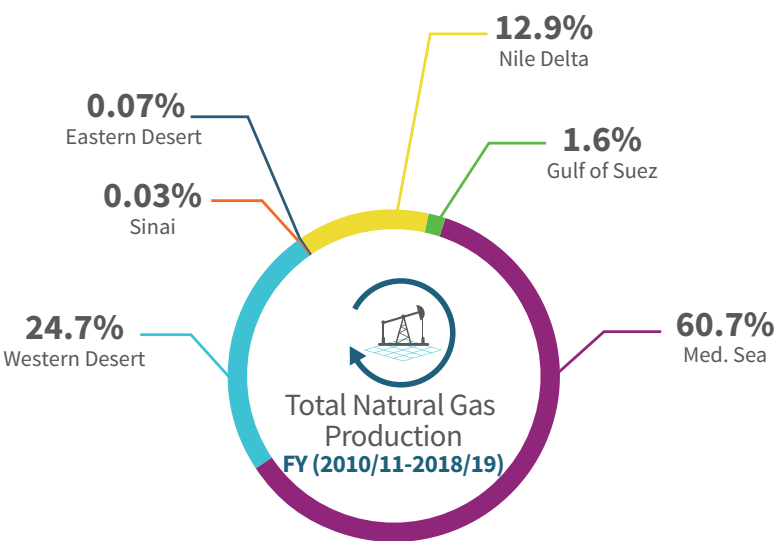
witnessed a decline until it reached its lowest level of 1.3 tcf in FY 2015/16, stated by EGPC and EGAS.

Yet, gas production has undoubtedly recovered since 2016, thanks to the government's efforts to clear its debts and improve the terms offered to IOCs. This has encouraged IOCs to invest in Egypt's upstream sector again and to fast-track field developments, in addition to the development of the giant Zohr field, which was discovered in 2015. Hence, the production followed an increasing trend starting from FY 2016/17 to reach its highest level of 2.4 tcf in FY 2018/19, explained by EGPC and EGAS.



The Egyptian natural gas production comes from six regions: the Mediterranean Sea, the Western Desert, the Nile Delta, Sinai, the Eastern Desert, and the Gulf of Suez. However, these regions contribute relatively different quantities.

The Mediterranean Sea, the Western Desert and the Nile Delta are regarded as the areas with the highest natural gas production. Over the aforementioned period, the three regions together contributed 17.3 tcf, representing 98% of the total natural gas produced. On the other hand, Sinai, the Gulf of Suez and the Eastern Desert together produced the remaining 2%, according to EGPC's and EGAS's data.



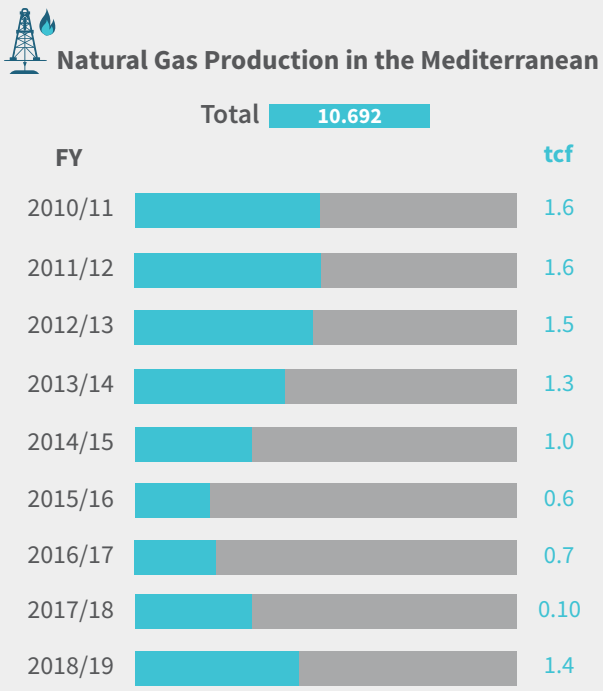
THE MEDITERRANEAN SEA

Most of Egypt's natural gas production comes from offshore fields located on the Mediterranean Sea where it takes over the highest share of more than 60% of the total production. Over the mentioned eight-year-period, the region contributed 10.7 tcf, producing on average 1.18 tcf annually, according to EGPC's and EGAS's data.

The region's natural gas production saw a steep decline over the period from FY 2012/13 - 2015/16, reaching the lowest level of 0.65 tcf in FY 2015/16. However, in light of the Zohr field developments, the Mediterranean's production trend started to slightly rise in FY 2016/17 by 8%, stated by EGPC and EGAS.

Furthermore, the production considerably increased in the region in FY 2017/18 by 40%, as the first production unit of Zohr field came on stream with 800 million standard cubic feet per day (mmscf/d) in December 2017, according to Eni's website.

In September 2018, the fifth production unit of the field contributed 2 billion cubic feet per day (bcf/d), resulting in a huge jump in the Mediterranean's production level in FY 2018/19 by 43%, recording 1.4 tcf of natural gas, explained by EGPC and EGAS.

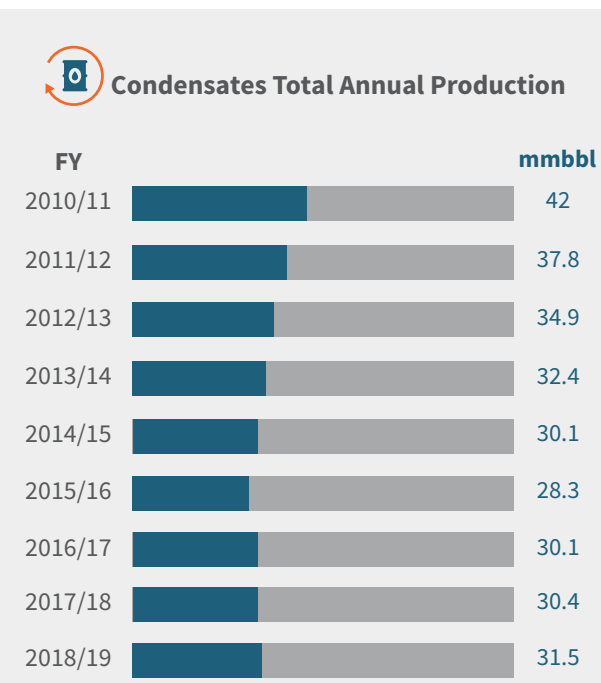


CONDENSATES PRODUCTION

Egypt's first production of condensates was from the Abu Madi, Abu Qir and Abu Gharadig fields in the late 1970s. Condensates production increased at an average rate of 10% per annum throughout the 1980s and 1990s. The production of condensates has primarily increased in recent years because of a number of new major gas and condensates projects starting up in the Nile Delta and Mediterranean region, according to Wood Mackenzie Country Overview, 2018.

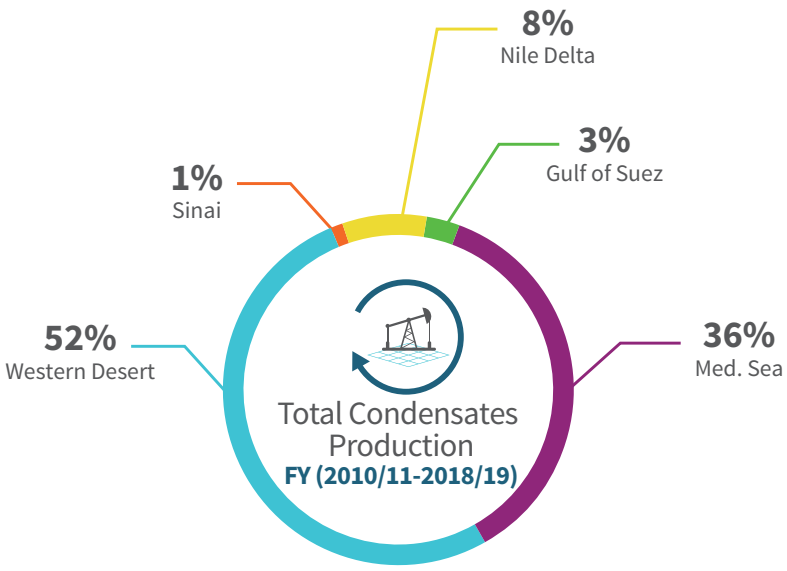
Condensate production recorded its highest level of 42 mmbbl in FY 2010/11. On the other hand, condensate production reached its lowest level of 28.345 mmbbl in FY 2015/16; FY 2014/15 and FY 2016/17 also experienced low levels of condensate production. The total production of condensate over the period of FYs (FY 2010/11-FY 2015/16) has shown a decreasing trend, explained by EGPC and EGAS.

Yet, the trend started to increase again to reach 31.5 mmbbl in FY 2018/19. The production of condensates grew by 6% in FY 2016/17 compared to the decline by 6% in FY 2015/16. The average total condensate production over the overall mentioned period amounted to 33.1 mmbbl/y, according to EGPC's and EGAS's data.



Condensate production areas are mainly concentrated in the Western Desert, Mediterranean Sea, and the Nile Delta. Condensates and natural gas liquids production has increased over the past decade as a result of the increase of natural gas production, partially offsetting declines in crude oil production, stated by EIA's 's Country Analysis Brief: Egypt 2019.

The Western Desert covered nearly 52% of the total production share during the mentioned period of FY 2010/11-FY 2018/19. The Mediterranean Sea region came next, contributing to 36% of the total production share. The Eastern Desert and Upper Egypt can be considered as the only condensates non-producer areas as per to their small production percentages, according to EGPC's and EGAS' data.



THE WESTERN DESERT

According to EGPC and EGAS, the Western Desert is the largest producer for condensates in FY 2018/19. The Western Desert production reached 15.68 mmbbl in FY 2018/19, compared to a lower amount of 15.37 mmbbl in FY 2017/18. The total production in the Western Desert reached 140.68 mmbbl since FY 2010/11.

It is notable that condensate production was at its peak in FY 2010/11 at 21 mmbbl/y, representing the highest record achieved by the Western Desert. As an overall, the presented period shows a declining trend in condensate production in the area, which continued until the end of this period, reaching its least amount 15.36 mmbbl in FY 2017/18.

Condensate production in the Western Desert faced a relative decline in FY 2012/13. The decline in FY 2012/13 was followed by a rate of increase of 5% in FY 2014/15. Nonetheless, the increase in 2015 was not persistent enough that it declined back intensely in 2016, according to EGPC's and EGAS's data.

Condensates Production in the Western Desert

Total 140.68

FY	mmbbl
2010/11	21
2011/12	19.4
2012/13	17.2
2013/14	16.6
2014/15	17.4
2015/16	16.9
2016/17	16.8
2017/18	15.4
2018/19	15.7

Egypt's MoP has launched in 2016 a project to modernize the petroleum sector through seven pillars, paving the way for Egypt to become a regional oil and gas hub in the future. The project was named the Modernization Project.

The period from 2016-2018 witnessed several achievements and discoveries. The Modernization Project compensated the natural decline of crude oil of 100,000 barrels (bbl) in 2018. Moreover, Egypt achieved the highest production rate of crude oil and natural gas in its history in June 2019, with 1.9 million barrels of oil equivalent per day (mmboe/d). Egypt's natural gas production hit a record of 7.2 bcf in September 2019.

Furthermore, a group of agreements took place on the sidelines of the project. In fact, a Memorandum of Understanding (MoU) was signed with Halliburton on March 4th, 2019, another one was signed by the MoP in February 2018 for Bapetco's modernization according to Egyptian Petroleum Show (EGYPS) 2018. Another agreement was signed with ESLSCA University in June 2019.

Most of the agreements aim to maximize the production assets, develop productive fields, improve the projects' economies, raise the level of performance, and apply governance standards. As per to all efforts done, the MoP has more and more to provide and improve the sector's performance and development.

