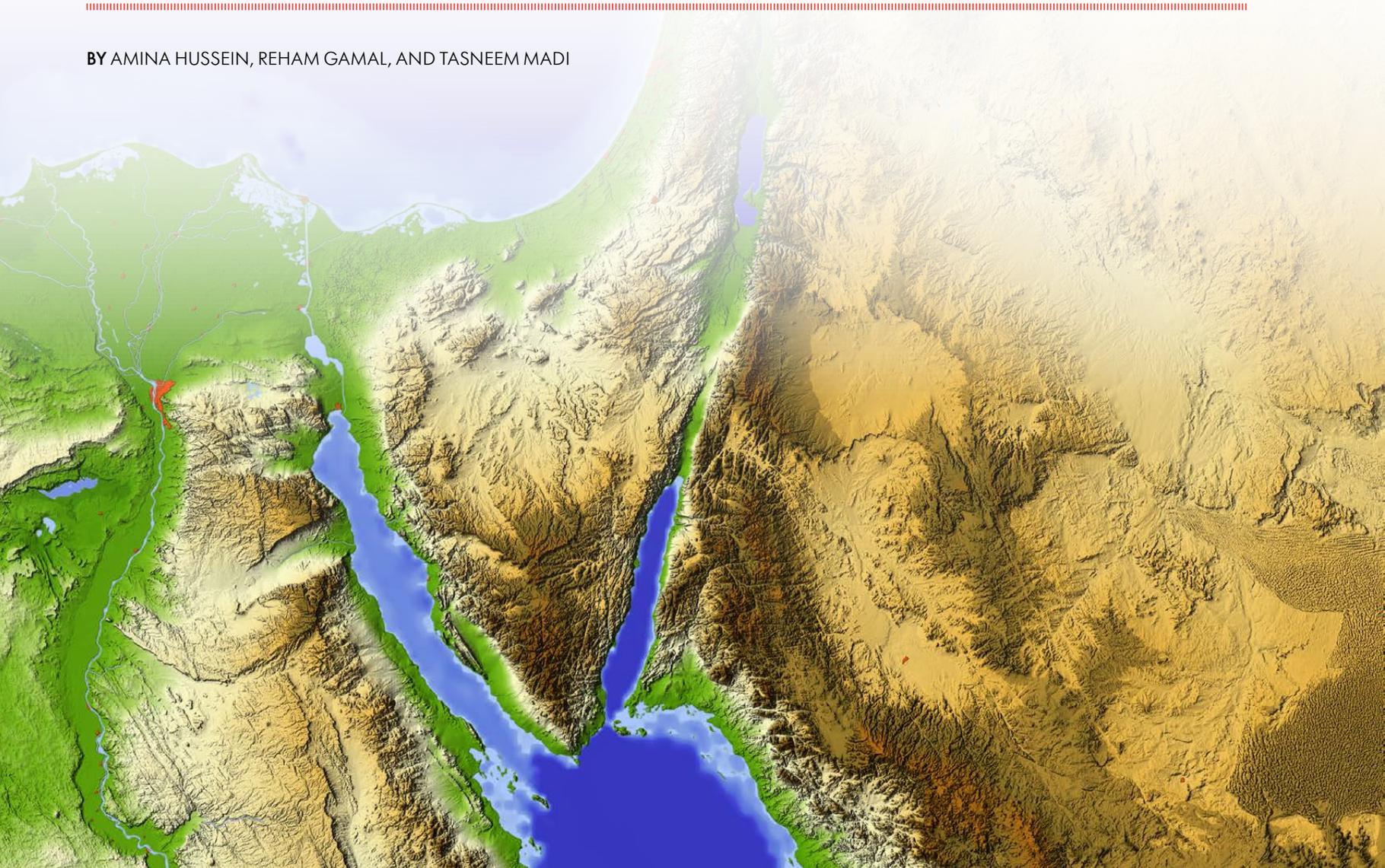


# GULF OF SUEZ, EASTERN DESERT AND SINAI: EGYPT'S CRUDE OIL SQUAD

BY AMINA HUSSEIN, REHAM GAMAL, AND TASNEEM MADI



The Gulf of Suez and its surrounding areas are among the oldest known hydrocarbon provinces in the world in which crude oil was first discovered in 1868, according to Hamdy El Banby's book entitled "The Egyptian Crude Oil: Past Experience and Future Insights". The Gulf of Suez, along with the Eastern Desert and Sinai, are among Egypt's main crude oil producing areas. The Gulf of Suez, the Eastern Desert, and Sinai produced a total of 87.7 million barrels (mmbbl) and 87.16 mmbbl of crude oil in the Fiscal Years (FYs) 2018/19 and 2019/20 respectively, according to the Egyptian General Petroleum Corporation (EGPC) data.

On the other hand, these three areas are not actively producing equivalent gas, as on average their production represents approximately 2% of Egypt's total equivalent gas production, according to the Egyptian Natural Gas Holding Company's (EGAS) data.

## BID ROUNDS

In May 2018, the EGPC launched an international bid round which offered different opportunities to International Oil Companies (IOCs) to explore and exploit crude oil and natural gas fields in different concessions. The bid round included 11 blocks; four of which are located in the Eastern Desert and the Gulf of Suez, according to the EGPC's official Website.

The bid round results were announced in February 2019, on the sidelines of the Egypt Petroleum Show (EGYPS). The Egyptian General Petroleum Company (GPC) was awarded a block in the Eastern Desert while Neptune Energy was awarded a block in the Gulf of Suez. The signature bonus of the two offered concessions totaled \$16 million. Furthermore, the total financial commitments recorded \$54.5 million to drill 13 exploratory wells, according to the Ministry of Petroleum and Mineral Resources' (MoP) official website.

## 2 Awarded Blocks in the Gulf of Suez & the Eastern Desert in 2019

Company	Concession	Signature Bonus (\$ million)	Minimum Financial Commitment (\$ million)	Exploratory Wells	Area (km <sup>2</sup> )
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GPC	West Amer	5	20	10	875.48
Neptune	North West El Amal	11	34.5	3	365

## ACTIVE AGREEMENTS

### 1. THE GULF OF SUEZ

Since the 1970's, over 10 petroleum companies have signed 34 agreements to exploit different concessions in the Gulf of Suez until June 2019. Dragon Oil, the operator of 12 concessions in the Gulf of Suez, represents the most active operating company in the region with a 35% share of signed agreements, as explained by the EGPC. As of June 2020, the signed agreements increased to 40, representing 23%

of the total active agreements. For instance, in early 2019, Wintershall Dea signed an Exploration and Production (E&P) agreement in the Ras Budran and El Zeit Bay oil fields. While, in early 2020, Neptune Energy signed an agreement to drill three exploration wells in the North West El Amal concession.

## 2. THE EASTERN DESERT & SINAI

Until June 2020, the Eastern Desert witnessed the signing of 14 active agreements with both IOCs and National Oil Companies (NOCs) representing a total share of 8% of the country's active petroleum agreements. All the active agreements in the region were development agreements. The most active company is TransGlobe, according to the EGPC's data.

As for Sinai, until June 2020, the area had a small share in petroleum active agreements with only two agreements representing only 1.2% of the total active agreements in Egypt, according to the EGPC's data.

### DRILLING ACTIVITIES

The average number of drilling rigs all together in the Gulf of Suez, the Eastern Desert, and Sinai fields in both FYs 2018/19 and 2019/20 amounted to 11 rigs, contributing about 11% of total drilling rigs, according to the EGPC data.

Over the two FYs, Sinai represented the region with the highest average number of drilling rigs. In fact, Sinai possessed 13 rigs, followed by the Gulf of Suez, which included 10 rigs. Over the referred period, the Eastern Desert accounted for 9 drilling rigs (on average), representing the lowest average number of drilling rigs among all areas, stated by the EGPC.

## PETROLEUM PRODUCTION

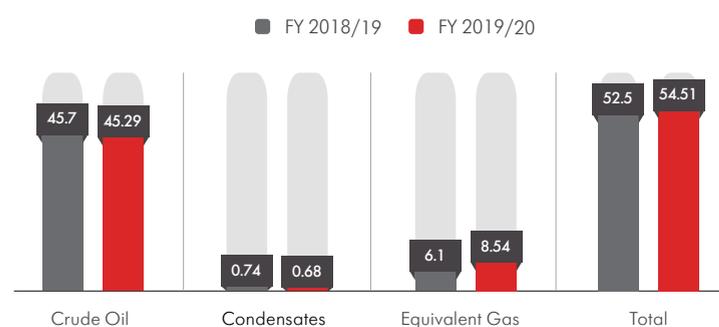
### 1. THE GULF OF SUEZ

The total petroleum production in the Gulf of Suez slightly decreased by 3.8% between FYs 2018/19 to 2019/20. This mainly happened as the region's crude oil production slightly declined over the same period. The decrease in crude oil production was natural as the fields are becoming more mature. Furthermore, the share of crude oil share in the Gulf of Suez's petroleum production declined from 87% in FY 2018/19 to 83% in FY 2019/20.

The condensates' share in the area's total petroleum production declined from 1.4% in FY 2018/19 to 1.2% in FY 2019/20. On the contrary, equivalent gas share increased from 11.6% in FY 2018/19 to 15.7% in FY 2019/20.



### Petroleum Production in the Gulf of Suez (mmbboe)



### 2. THE EASTERN DESERT

As for the Eastern Desert, the total petroleum production declined by 0.9% between FY 2018/19 and FY 2019/20. This decrease was mainly driven by the reduction in crude oil production as it recorded an annual decline of 2% between the aforementioned years. However, the equivalent gas production increased to represent 3% of the region's total petroleum production in FY 2019/20 compared to the 2.5% in FY 2018/19.



### Petroleum Production in the Eastern Desert (mmbboe)



### 3. SINAI

Unlike the Gulf of Suez and the Eastern Desert, the total petroleum production of Sinai increased by 1.3% between FYs 2018/19 and 2019/20. This increase was mainly due to a slight increase in the production level of crude oil, as the produced crude also increased by 1.3% between FYs 2018/19 and 2019/20. On the other hand, condensates' production remained constant at 0.2 mmbbl, while the equivalent gas shares in Sinai's total petroleum production recorded 0.05% in FY 2019/20 compared to 0% in FY 2018/19.



### Petroleum Production in Sinai (mmbboe)



## MAIN OPERATORS

### 1. DRAGON OIL

Dragon Oil is a privately owned subsidiary of Emirates National Oil Company (ENOC). Dragon Oil participated in the Ganope International 2012 Bid Round which offered 20 exploration blocks in the Western Desert, the Eastern Desert, the Red Sea and the Gulf of Suez.

In late 2013, the company was awarded the East Zeit Bay concession in the Gulf of Suez with 100% interest. The concession is adjacent to a number of producing crude oil fields named East Zeit, Hilal, Ashrafi, Southwest Ashrafi and Zeit Bay fields, according to Dragon Oil's website.

Furthermore, in late 2019, the company acquired the stake of BP at the Gulf of Suez Oil Company (GUPCO) at a value of \$850 million. The company has then become the contractor with the EGPC, as stated by Dragon Oil's CEO, Ali Rashed Al Jarwan in an interview with Al Arabiya in January 2020.

Accordingly, the company holds interest in 12 concessions, namely: East Tanka, Integrated, South Belayim, South Gharah, East Shukeir, LL 87 (1,2), East Morgan, North Gharah, West Morgan, Northeast Ramadan, North October and South Ghareb. The company is aiming to increase its production from GUPCO'S concessions from 60,000 barrels per day (bbl/d) to reach 75,000 bbl/d by 2021, with investments of \$1 billion.

### 2. WINTERSHALL DEA

Wintershall Dea has been active in Egypt for over 40 years, through Dea, and currently has a stake in six onshore and offshore concessions.

Successfully, the company has been producing crude oil in the Gulf of Suez for more than 30 years from the concession of the Ras Budran and Zeit Bay fields. The two concessions are operated by the Suez Oil Company (SUCO), Wintershall Dea's Joint Venture (JV) with the EGPC. Since 1983, the two concessions have been developed to produce over 650 mmbbl of crude oil, explained in Wintershall Dea's official website.

During 2017 and 2018, Wintershall Dea pumped about \$800 million in its fields in the Gulf of Suez, Disouq and North Alexandria. The company also plans to invest around \$700 million over the upcoming three years, \$225 million of which is determined to be invested in the Gulf of Suez alone, according to a statement by the company.

In early 2019, Wintershall Dea signed an agreement, with the MoP and the EGPC, to extend the concession of the Ras Budran and Zeit Bay fields for five years ending mid-2022. The agreement contains an optional extension of extra five years until 2027, as stated by the company's Managing Director of Egypt, Sameh Sabry, during the signing of the agreement in March 2019.

## 2. CHEIRON

Cheiron (formerly known as PICO International Petroleum) was established in the late 1980s. Since then, the company has been engaged in the upstream activities in Egypt as one of the largest independent E&P companies.

In 1990, the company achieved production rates of 5,000 bbl/d of crude oil after acquiring Total's rights in the Amal, Shukher Bay, South Ramadan and Gamma fields in the Gulf of Suez. In 1995, Cheiron extended its activities in the Gulf of Suez by acquiring Shell's 100% equity share. In 1998, Cheiron bought Kuwait Foreign Petroleum Exploration Co.'s (KUFPEC) 73.5% equity share in the Amal field. Furthermore, in 1999, Cheiron purchased BP's share in North Zaafarana, according to Cheiron's Website.

In 2015, Cheiron succeeded in completing the first phase of the Amal field. In addition, the company was awarded 100% of the North Magawish concession, through the Ganope International Bid Round, with financial commitment of \$23.5 million, and a \$1 million signing bonus.

In 2018, the Geisum and Tawila West concession, where Cheiron holds 65% working interest, was successfully extended until June 2027. The Concession is located at the Gulf of Suez and its current average production reaches 4,900 bbl/d of crude oil, it covers the North Geisum, South Geisum, Northeast Geisum and Tawila West fields. In mid 2019, the company made a discovery in the Nukhul formation north west of the main Geisum field, according to Cheiron's Website.

## 3. TRANSGLOBE

TransGlobe has been operating in the Egyptian Eastern Desert since July 2004, when the company entered a farm-out agreement and received 50% interest in the Nuqra Concession.

In December 2011, TransGlobe further acquired a 100% working interest in the West Bakr Concession. Then, in November 2013, the company fully acquired interest in the North West (NW) Gharib and South West (SW) Gharib Concessions. However, in 2016, the company relinquished the SW Gharib concession. In May 2017, the company also relinquished NW Gharib's exploration area in May 2017, and retained four development areas, one in production and three pending approval. TransGlobe is also the operator of West Gharib concession jointly with SDX Energy (50% working interest), according to TransGlobe's website.

## 4. SDX ENERGY

Since 2008, SDX Energy has been engaged in exploration and development activities in Egypt's Eastern Desert and Gulf of Suez basins.

The company has 50% working interest in the West Gharib concession in the Gulf of Suez where its production is from the Mesada and Rabul fields. The company's cumulative production from the concession reaches 11.1 million barrels of oil equivalent (mmbbl) from 16 producing wells. In late 2019, the company announced a new crude oil discovery in the concession, producing an average of 315 bbl/d, according to a company's statement released in September 2019.

For the Eastern Desert, the company has 50% non-operating interest where its activities lie in Geyad and Al Amir field. The cumulative production from the two fields reaches about 30 mmbbl. According to the company's Operations, Financial and Guidance for 2020, SDX Energy targets production of 1,000 to 1,500 barrels of oil equivalent per day (boe/d) from North West Gemsa concession.

However, recently, the company announced selling its 50% working interest in the North West Gemsa licence. The purchaser, Gulf Energy, has paid \$3.0 million for the Company's interest, of which \$1.4 million has been used to discharge the Company's remaining liabilities on the licence.

## MAIN FIELDS

### 1. THE GULF OF SUEZ

In 1869, Gemsa field was discovered, in the Gulf of Suez, and was the first crude oil discovery in Egypt. This discovery was followed by discovering a number of fields, namely: Morgan, Belayim, Abu Rudeis/Sidri, October and Ras Shukeir fields, according to a baseline study titled by "The Geology and Mineral Resources in South Sinai".

Recently, on June 18, a new discovery (GNN-4) was announced in Geisum Concession at the south of Gulf of Suez, with an initial crude oil production rate of 2,000 bbl/d, according to the MoP's press release.

### GEMSA

In 1910, Gemsa started its production. The first drilled well in the field was producing 25 bbl/d of crude oil. Gemsa and Zaafarana fields' production reached 4.9 mmbbl/d in 2019, according to the EGPC.

### RAS SHUKEIR

Ras Shukheir is one of the most significant fields in the Gulf of Suez and is operated by GUPCO. In FY 2018/19, the field's production reached about 61,700 bbl/d of crude oil, as stated by the Geologist Khaled Hamdan, Chairperson of GUPCO during his meeting with the Minister of Petroleum and Mineral Resources, Eng. Tarek El-Molla, announced in a ministerial press release, in August 2019.

### 2. THE EASTERN DESERT

Three main concessions are located in West Bakr, West Gharib and North West Gharib concessions in the Eastern Desert; adjacent to the West Gharib concession, 20 kilometers west of the Gulf of Suez coast. The West Bakr concession is composed of three oil fields, which are West Bakr H, K and M, operated by TransGlobe Energy Corporation.

On the other hand, the West Gharib concession is also operated by TransGlobe. The concession includes five fields, which are Arta, East Arta, Hana, Hushia, and West Hushia fields. Furthermore, in the North West Gharib concession, on the west coast of the Gulf of Suez, most of the explorations have consisted of wells in Arta and East Arta fields, according to TransGlobe's website.

In 2019, Transglobe extended its drilling operations at the H field and K field. Additionally, Transglobe converted undeveloped reserves at Northwest Gharib and M and H fields, which led to addition of 3.4 MMbbl of crude oil and natural gas liquids, according to Transglobe's announced 2020 capital budget and 2019 year-end reserves.

The company also allowed technical revisions at West Bakr, and West Gharib and other concessions revisions, where 3.8 MMbbl and 0.6 MMbbl of crude oil and natural gas liquids were added, respectively, due to better performance resulting from production optimization projects.

### 3. SINAI

Sinai has three of the oldest discovered crude oil fields namely: Sudr (discovered in 1945), Asl (discovered in 1947) and Matarma (discovered in 1948), according to a baseline study titled by "The Geology and Mineral Resources in South Sinai". Such fields were discovered by GPC. In 2017, Mediterra Energy Corporation (MEC) raised production rates at the three fields to 1,400 barrels of boe/d, up from 1,200 boe/d, according to a MoP's statement. In January 2020, MEC made a new drilling in the Asl field with investments of \$1.3 million.

Furthermore, the Nour-1 New Field Wildcat (NFW), a new natural gas discovery, located in Noor North Sinai concession was discovered by Eni. The field was drilled by the Scarabeo-9 semi-sub in a water depth of 295 meters and reached a total depth of 5,914 meters, according to Eni's press release in March 2019.

## INFRASTRUCTURE

### 1. CRUDE OIL INFRASTRUCTURE

The Gulf of Suez and Sinai have mainly eight crude oil pipelines. One of the most well-known pipelines is Suez-Mediterranean Pipeline (SUMED), which is located in the West Bank of the Gulf of Suez. The SUMED has the biggest length (320 km), diameter (42 inches) and capacity (2.4 mmbbl/d) among other crude oil pipelines, operated by the Petroleum Pipeline Company (PPC). SUMED transported oil from the Ain Sokhna terminal to the Sidi Kerir terminal on the Mediterranean coast through the Dashour pumping station. On the other hand, two of the total eight pipelines, Al Hafair-Suez and Al Hafair-Mostorod, transport crude oil from Al Hafair to Suez and Mostorod Refinery.

## Crude Oil Infrastructure in the Gulf of Suez/Sinai

Pipeline	From	To	Length (Km)	Diameter (Inches)	Capacity (bbl/d)
SUMED (Ain Sukhna-Sidi Kerir)	Ain Sukhna	Sidi Kerir	320	42	2,400,000
Zeit Bay Facilities-Ras Gharib	Zeit Bay Facilities	Ras Gharib	83	18	-
Ras Shukheir-Asyut	Ras Shukheir	Assiut Refinery	280	20/22	-
Ras Shukheir-Al Hafair	Ras Shukheir	Al Hafair	215	26	140,000
Al Hafair-Suez	Al Hafair	Suez	35	18	50,000
Al Hafair-Mostorod	Al Hafair	Mostorod Refinery	135	18/20	85,000
Al Hafair-Mostorod	Al Hafair	Mostorod Refinery	115	24	85,000

42% and 44.37% of Egypt's total crude oil production, respectively, according to the EGPC's data. Most of the fields in the three areas are becoming as mature as the fields of Morgan, Ramadan and Zeit Bay. However, the areas have the potential for further exploitation and exploration. Based on this, the MoP, along with its domestic and international partners, seek to compensate for the natural decline in production rates through developing the regions to achieve more discoveries and attract more investors.

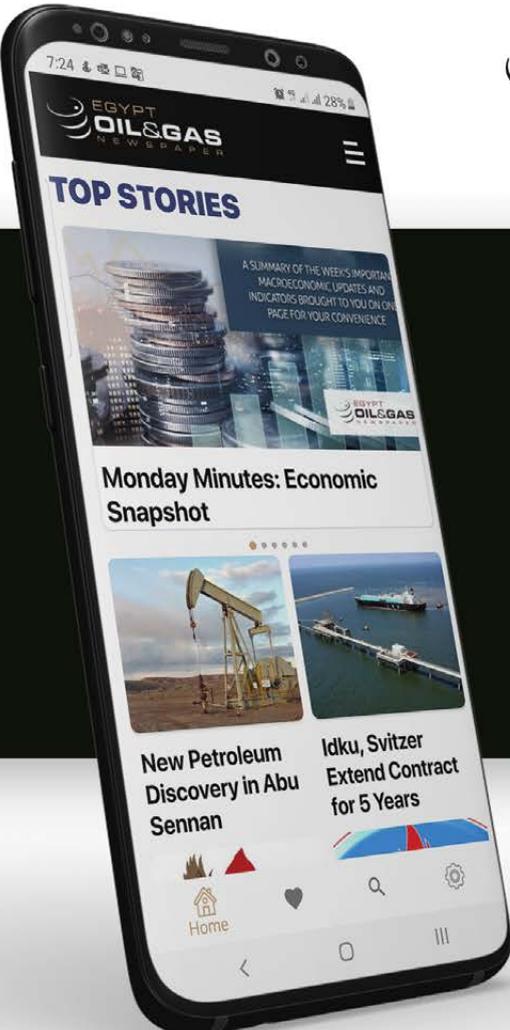
## Natural Gas Infrastructure in the Gulf of Suez/Sinai

Pipeline	From	To	Length (Km)	Diameter (Inches)	Capacity (mmcf/d)
Trans Gulf Gas	Petresco Plant	Ras Bakr Transmission Station	75	12	110
Zaafarana-Korimat	Zaafarana	Korimat Power Station	163	18	105
Zeit Bay-Ras Shukheir	Zeit Bay (Pre-2017)	Ras Shukheir	40	16	140
Ras Shukheir-Suez Gas Trunkline	Ras Shukheir	Suez	245	16	160
Suez-Cairo Ring	Suez	Cairo Ring	150	10	-
Suez-Port Said	Suez	Port Said	160	16	-
El Arish Gas Pipeline	Port Said	El Arish	185	36/42	-

### 2. NATURAL GAS INFRASTRUCTURE

The Gulf of Suez and Sinai have seven natural gas pipelines. Two of the seven pipelines (i.e. Trans Gulf Gas and Zaafarana-Korimat pipelines) transport natural gas to be pumped in two stations: Ras Bakr Transmission Station and Korimat Power Station.

The Gulf of Suez along with the Eastern Desert and Sinai are pioneering areas of hydrocarbons production in Egypt. Furthermore, the three regions combined are major crude oil producers. In fact, in FYs 2018/19 & 2019/20 the regions represented



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