

BRIEFING PAPER

# THE QUEST FOR GAS

Gas exploration and production in the Mena region

SEPTEMBER 2019

# MAPPING A NEW PATH

Governments around the world are rolling out ambitious policy initiatives aimed at reducing harmful greenhouse emissions. A central pillar of these policies is the move towards a cleaner energy mix that employs a greater share of renewable energy and less polluting fuel sources, such as natural gas.

Until recently, only a handful of state-owned energy companies in the Middle East and North Africa (Mena) region with access to easily recoverable gas have been able to produce enough natural gas to sell to customers. Now others with less developed gas reserves are also seeking to raise their production with a sense of urgency, both to fulfil domestic demand and claim some share of the global gas market.

This has significantly intensified competition in the region's upstream gas arena. The push towards enhancing gas production capacities had led to national oil companies not just undertaking multi-billion dollar gas development schemes but also embarking upon robust gas exploration campaigns.

## DRIVE FOR GAS

Natural gas has been touted as the energy source of choice during the world's transition from fossil fuels to clean energy due to its abundance across the world, from the shale fields of the US and the giant shared Gulf formations being exploited by Qatar and Iran, to the huge gas fields in Russia and Australia.

With an estimated \$33.5bn-worth of upstream gas projects under execution, according to regional projects tracker MEED Projects, the Mena region is one of the lead-

ing upstream natural gas markets globally.

In terms of natural gas, the boosting of supplies and production capacity have become a priority for many governments across the region, as they aim to meet domestic demand, which has grown by up to 15 per cent annually, led by the power and industrial sectors. Natural gas is also expected to be the fastest-growing fossil fuel globally, driven by the increased use of gas in the energy mix.

At the end of 2018, Iran had the world's second largest gas reserves with 1,127.7

trillion cubic feet (tcf), according to UK-based BP. It was followed by Qatar, which thanks to its North Field gas reservoir, has the world's third-highest gas reserves at 872.1 tcf. Saudi Arabia, the UAE, Algeria and Iraq were also among the top 15 holders of gas reserves.

With any potential increase in associated gas production restricted by Opec's oil production quotas, the focus has been on developing non-associated gas fields in Saudi Arabia, Iraq, Algeria and Kuwait and on sour and tight gas deposits in Abu Dhabi and Oman.

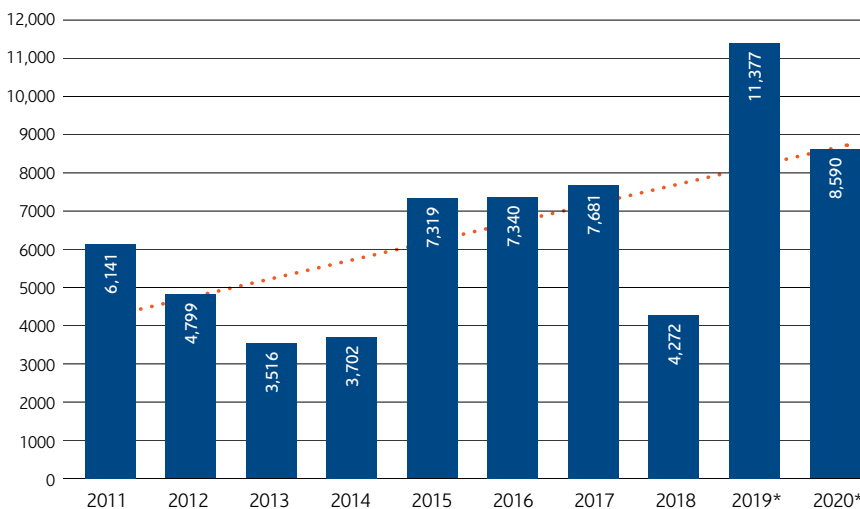
Saudi Arabia leads Mena region's upstream gas sector, accounting for 49 per cent of the value of projects currently under execution. It is followed by Iran and Algeria, with 14 per cent and 11 per cent of activity, respectively.

Yet spending on upstream gas projects has also been disrupted over the past 10 years, with the 2008 global financial crisis and late-2014 oil price crash hurting most hydrocarbon exporters in the region.

More recently, there has been a huge uptick in gas project activity, reflecting the shift in energy demand. As a result, the expected value of project awards in 2019 is significantly greater than that of 2018.

This recovery in regional project spending is being driven by a sincere desire among energy enterprises to raise production in order to meet growing global and domestic demand for gas as a cleaner energy alternative, as well as projected slump in demand for crude oil.

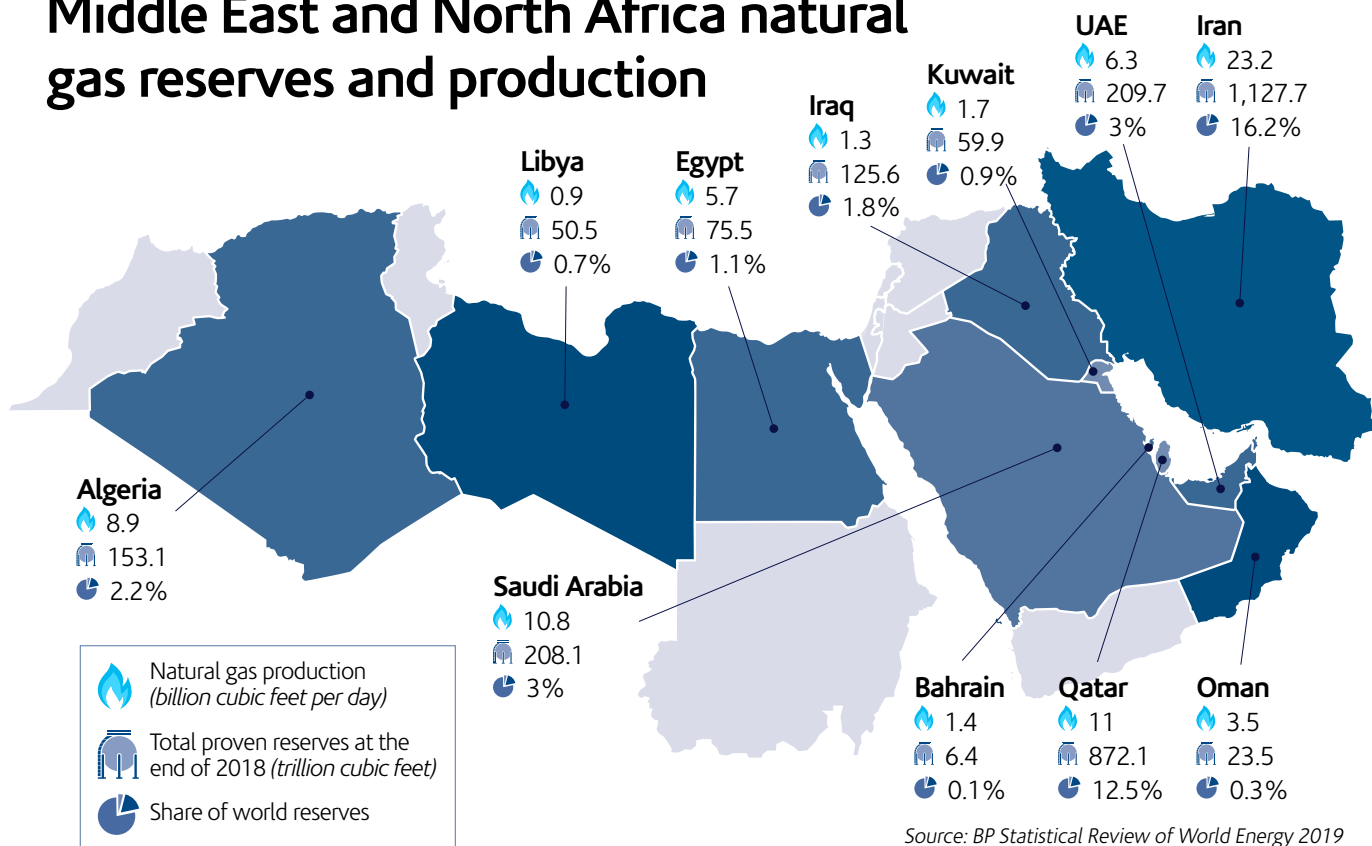
Mena upstream gas projects contract awards estimate and forecast (\$m)



\*Data for 2019-2020 includes estimation and forecast

Source: MEED Projects

# Middle East and North Africa natural gas reserves and production



Source: BP Statistical Review of World Energy 2019

## LEADING THE CHARGE

The Mena region is one of the world's leading markets for gas projects, holding more than 45 per cent of global gas deposits

### ALGERIA

More than half of Algeria's proven gas reserves are found at the Hassi R'Mel field in the southeast, but the most promising area for the future is in the southwest of the country which includes Touat, Reggane North and Timimoun.

Following the resignation of President Abdelaziz Bouteflika on 2 April 2019, Algeria's hydrocarbons sector has faced political disruption that has resulted in an uncertain

outlook for international oil companies (IOCs). After five years of consecutive growth in gas production in Algeria, output slipped by 0.7 per cent in 2018, according to data by BP. This is equivalent to a gas production volume of 8.9 billion cubic feet per day (cf/d) for the year, down from 9 billion cf/d in 2017.

Texas-based ExxonMobil has currently shelved talks with Algeria's national oil company Sonatrach to develop a field in the southwestern Ahnet basin, following domestic unrests.

A key reform necessary to bolster Algeria's energy sector and provide certainty for IOCs is the much-awaited revision to the hydrocarbons law.

### BAHRAIN

All of the kingdom's gas comes from the Bahrain field, where non-associated gas from the Khuff and pre-Khuff reservoirs and associated gas is produced. Natural gas production increased from 1.1 billion cf/d in 2007 to 1.5 billion cf/d in 2017, although the increase has still been insufficient to meet rising demand.

Eni signed an MoU with Bahrain's Na-

tional Oil & Gas Authority (Noga) in January 2019 to explore for oil and gas in the kingdom's offshore Block 1 area.

The 2,800 square kilometres (sqkm) block, which lies in the northern waters of Bahrain with depths ranging from 10m-70m, is still largely unexplored.

Bahrain announced the discovery of the Khaleej al-Bahrain basin in 2018, which could hold unconventional oil, as well as between 10-20 tcf of gas.

### EGYPT

Data by BP shows Egypt produced about 5.7 billion cf/d of gas in 2018, up from 4.7 billion cf/d in 2017. Much of this increase is due to the success of the Zohr gas field, the biggest gas field discovered to date in the Mediterranean, with an estimated 30 tcf of reserves.

Italy's Eni operates the offshore Nour gas exploration concession, with a 40 per cent interest, with other stakeholders including BP (25 per cent), Abu Dhabi's Mubadala Petroleum (20 per cent) and Tharula Petroleum (15 per cent).

Egypt launched an upstream licensing

round in May 2018, offering 27 blocks in total, 16 of which are laden with gas.

In February 2019, BP began gas production from the Giza and Fayoum fields as part of its West Nile Delta development, at an initial rate of 400 million cf/d.

## IRAN



Iran holds the world's second biggest proven reserves of natural gas, after Russia.

South Pars, an offshore field which Iran shares with Qatar, is the largest gas field in the world and contains 40 per cent of Iran's total gas reserves and most of its non-associated deposits.

Iran's other major gas fields include Kish, North Pars, Tabnak, Forouz and Kangan, which also include significant condensate reserves.

In 2017, about 1.6 tcf of gas was reinjected into oil wells to enhance oil recovery (EOR), which plays a key role in the country's oil production.

Gas production is forecast to rise further in the coming years, as additional phases of the South Pars development are brought onstream.

The ongoing challenge for Iran is to maximise the value gained from this resource through the promotion of exports and the management of inefficient domestic usage and wastage.

## IRAQ



About 70 per cent of natural gas reserves in Iraq are found alongside oil in associated fields. Non-associated, or free gas, accounts for around 20 per cent and cap or dome gas the other 10 per cent.

Iraq's only non-associated gas production comes from the Al-Anfal field, which produces about 200 million cf/d.

The estimates of Iraq's gas reserves rose to 125.6 tcf at the end of 2018, according to BP.

However, the gas produced is re-injected for EOR or used as fuel for power generation.

Upstream oil operations in Iraq are supported by two gas entities, North Gas Company and Basra Gas Company, which capture and process associated gas produced at Iraq's oil fields.

In the north of Iraq, the Kirkuk, Ain Zalah, Butmah and Bai Hassan fields are the main sources of associated gas, while in the south, the Rumaila and Zubair fields are the primary sources.

## KUWAIT



Despite being a major oil producing country, Kuwait to date has struggled to produce enough gas to meet its domestic demand, let alone export it.

Kuwait Petroleum Corporation (KPC) is nevertheless targeting production of 4 billion cf/d by 2020. This is an ambitious target and many industry insiders believe that Kuwait will struggle in its efforts to increase production significantly over the next decade.

KPC subsidiary Kuwait Oil Company (KOC) is targeting output from the Sabriyah and Umm Niqa fields, with the goal of producing 1.6 billion cf/d of non-associated gas by 2020, to raise overall gas production to 2.6 billion cf/d.

KOC has also set a total budget of \$900m for its planned upstream gas projects known as Jurassic production facility 4 (JPF4) and JPF5.

Meanwhile, the main package for phase 1 of KOC's Ratqa Lower Fars heavy oil megaproject is in its final phase and is expected to be completed soon. This project is expected to produce considerable amounts of associated gas.

## LIBYA



As of 2018, Libya had the ninth-largest estimated natural gas reserves in the Mena region.

While Libya's oil output has fluctuated wildly due to disruptions from frequent protests and security threats, its offshore gas production has been largely unaffected, so gas exports have been a reliable source of revenue.

In October 2018, the National Oil Corporation (NOC) completed the first tests after installing new gas compressors, in order to help boost gas production at its onshore Wafa gas field by as much as 80 million cf/d. Another two compressors will take output to more than 100 million cf/d.

The Bahr Essalam project, which sits about 110 kilometres off the Libyan coast, is operated by Mellitah Oil & Gas, a joint venture of Eni and NOC.

Gas production from phase 2 began in March 2019, with 10 wells linked to Mellitah's Sabratha Marine Platform.

The field was brought onstream in 2005 and produces 995 million cf/d of gas, along with 36,000 barrels a day (b/d) of condensates.

## MOROCCO



Domestic gas production in Morocco is just starting out. It has just two producing gas fields: the Gharb field to the north of Rabat, which has an annual production of about 800 million cubic feet; and Essaouria, southwest of Marrakech, which produces about 1.8 billion cubic feet annually.

New production from the UK-based Sound Energy's discovery in Figuig Province could increase domestic production to some degree over the coming years, but Morocco will remain heavily reliant on imported gas.

Morocco meets the majority of its gas demand with imports from Algeria via the Gazoduc-Maghreb Europe (GME) pipeline, which connects Algeria to Spain via Morocco. Algeria supplies gas to Morocco as payment in kind for transit fees.

## OMAN

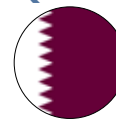


It is hoped that the increasing production of conventional gas, together with the development of the first tight gas programme at Khazzan, will help in turning Oman into a net exporter of gas.

In February 2019, Oman's Ministry of Oil & Gas signed an agreement stating state-owned Oman Oil Company (OOC) and Petroleum Development Oman (PDO) will work with British-Dutch owned Shell and France's Total to develop reserves in the gas acreage in the northern part of Oman's Block 6.

PDO started producing hydrocarbons from its Rabab Harweel Integrated Project in July 2019, citing a gas production capacity of 175 million cf/d from the project.

## QATAR



Qatar's North Field contains a total recoverable gas of more than 900 tcf, or 10 per cent of world's known reserves, and is considered the largest single non-associated gas reservoir in the world. It is known as the South Pars field in Iran where it occupies around 3,700 sqkm of area, with the remaining 6,000 sqkm in Qatar. The bulk of the production of North Field gas is aimed at LNG.

Persistent problems with a pipeline have led to further delays for the \$10bn Barzan gas development. Phase one is now expected to come online by the end of 2019 and is expected to have a capacity of 1.4 billion cf/d.

The gas from phase one will be supplied

to power stations, industrial units and petrochemicals sector.

## SAUDI ARABIA



State firm Saudi Aramco is currently tasked with dramatically raising domestic gas reserves to achieve Saudi Arabia's national target.

Aramco claims to produce about 14 billion cf/d of raw gas, targeting an output of 23 billion cf/d within the next decade, as part of its long-term energy plans. This will help the kingdom lift the share of gas in its power generation mix to 75 per cent, up from 55 per cent currently.

Aramco is gradually placing significant emphasis on unconventional gas reserves, so as to deliver significant unconventional gas production by developing high sulphur (sour) gas, tight gas and potential shale gas reserves.

Aramco has undertaken a project to develop the Haradh gas compression plants and expand the Hawiyah gas plant, which, when completed in 2021, will add a gas processing capacity of 3.6 billion cf/d.

The under-execution Fadili gas project will further increase Aramco's gas processing capabilities by 2.5 billion cf/d when it is commissioned in 2019.

## UAE



The UAE is the eighth-largest gas reserves holder globally and the fourth biggest in the Middle East. More than

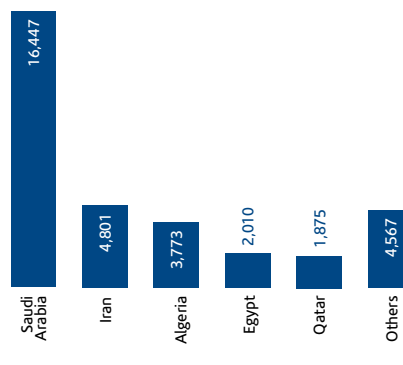
90 per cent of the UAE's gas reserves are found in Abu Dhabi, with smaller amounts located in Sharjah, Dubai and Ras al-Khaimah.

## ABU DHABI

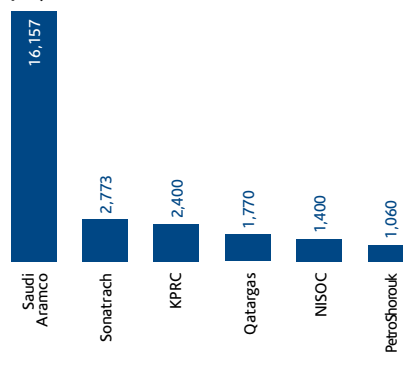
Most of Abu Dhabi's gas deposits are either associated with oil (meaning that output can only be increased if Opec oil quotas rise) or are very sour non-associated deposits, making exploitation technically difficult and cost intensive.

Abu Dhabi National Oil Company (Adnoc) claims to maintain a raw gas production level of 9.8 billion cf/d, which it plans to grow as part of its 2030 strategic goals. Abu Dhabi's Supreme Petroleum Council, which in November 2018 approved Adnoc's \$132bn capital expenditure budget for the next five years, announced new discoveries

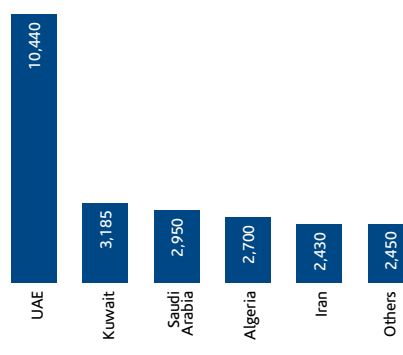
Upstream gas projects under execution by country (\$m)



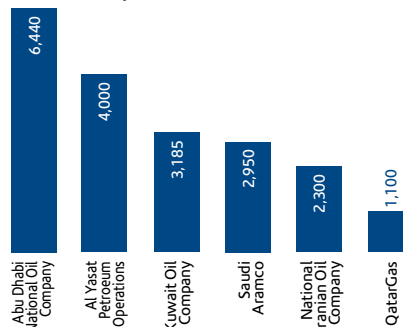
Top project spenders by value of upstream gas projects under execution (\$m)



Upstream gas projects in advanced pre-execution\* by country (\$m)



Top clients by value of upstream gas projects in advanced pre-execution\* (\$m)



\*advanced pre-execution = progressed beyond the study phase

Source: MEED Projects

of 15 tcf of gas in place. These have introduced the prospect of Abu Dhabi becoming a net gas exporter, and Adnoc is expected to leave no stone unturned to exploit the resource.

Adnoc has awarded Eni a 25 per cent stake in Abu Dhabi's Ghasha sour gas concession, and plans to unlock other sources of gas including Abu Dhabi's gas caps and unconventional gas reserves in addition to new natural gas accumulations. Adnoc has also awarded Total a 40 per cent stake in the Ruwais Diyab unconventional gas concession.

Adnoc is also pushing ahead with its second upstream licensing round, after the successful completion of Abu Dhabi's first such exercise ever. This is a part of Adnoc's strategic objective to attract IOCs with experience and financial wherewithal to explore fresh reserves in Abu Dhabi's onshore and offshore areas.

## SHARJAH

Sharjah's gas development includes three fields, Sajaa, Moveyid and Kahaif.

In January 2019, state-owned Sharjah National Oil Company (SNOC) awarded operating stakes to Eni in all three concession areas offered by the emirate in its licensing round.

Eni won 75 per cent, 50 per cent and 75 per cent stakes in Areas A, B and C, respectively, with SNOC holding the remaining stakes in those concessions, making Eni the sole foreign firm Sharjah has partnered with for its upstream exploration drive.

When SNOC launched its licensing round last year, it said all suitable field discoveries could be tied-in to its existing infrastructure in the acreage, gas-condensate processing plant and export facilities, allowing foreign operators to generate early cash flow at lower capital expenditure. SNOC has offered to purchase the resulting hydrocarbons.

## RAS AL-KHAIMAH

Eni has signed an agreement for exploration and production operations in Ras al-Khaimah, for an area known as Block A Offshore. Block A covers 2,412 sqkm, with water depths ranging from 10 to 90 metres. Eni will act as operator with a 90 per cent participating interest, while RAK Gas, which is owned by the government of Ras al-Khaimah, is a partner with a 10 per cent stake.

\*Iran, Algeria, Qatar

## About MEED

MEED has been integral to delivering business information, news, intelligence and analysis on the Middle East economies and activities for over 60 years.

Attracting a key senior management audience through its content and activities, MEED is a media brand, publication and data business that covers a spectrum of services which inform, engage, connect and ultimately support our subscribers and partners in their business development and strategic growth.

Acquired by GlobalData Plc in December 2017, MEED is now part of one of the largest data and insights solution providers in the world with the capacity to build global communities for our clients.

Our purpose is to support the region's companies make better and more timely decisions through our innovative data solutions and grow through our comprehensive and world-class marketing solutions. To find out more email: [info@meed.com](mailto:info@meed.com)

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## About Mashreq

Established in 1967, Mashreq is the oldest bank in the UAE, with award-winning financial solutions and services.

Throughout its 50 years' history, Mashreq has differentiated itself through innovative financial solutions, making it possible for its customers to achieve their aspirations.

Today, Mashreq has a significant presence in 11 countries outside the UAE, with 21 overseas branches and offices across Europe, the US, Asia and Africa.

Mashreq launched its new Vision and Mission recently, outlining its commitment towards its clients, colleagues and

the community. In line with its vision to be the region's most progressive bank, Mashreq leverages its leadership position in the banking industry to enable innovative possibilities and solutions for its customers across corporate, retail, international, treasury and Islamic banking.

Mashreq is proud to be the first financial institution in the UAE to be awarded the Gallup Great Workplace Award for four consecutive years from 2014-17.

Mashreq also continues to invest in recruiting, training and developing future generations of UAE national bankers.

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