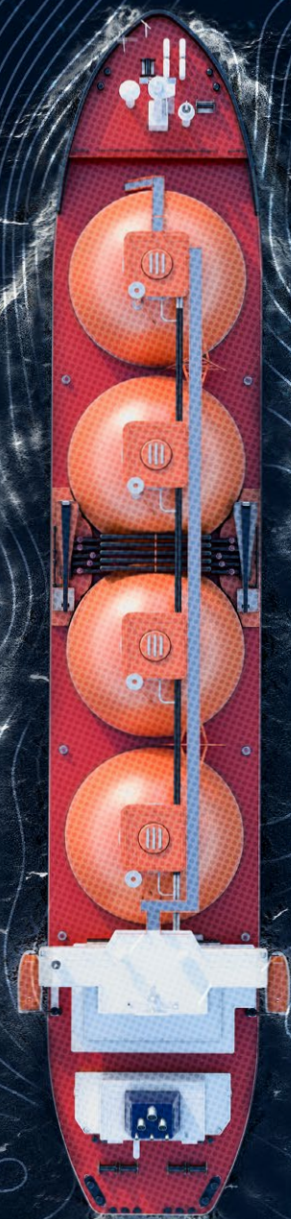


BRIEFING PAPER

ENERGY INFRASTRUCTURE

Regional trends in the midstream oil and gas sector

FEBRUARY 2020



STRATEGIC THINKING

Growing competition in the oil and gas trading market has prompted midstream players to expand their storage infrastructure and terminals, and to invest in revamping and developing their pipeline networks. However, oil demand fluctuations, and the risk they pose to profitability, has made the need for enhancing crude storage and transport infrastructure more immediate.

The threat of supply disruptions arising from regional geopolitical tensions and the recent introduction of International Maritime Organisation's (IMO) 2020 sulphur regulations on marine fuel, have made building assets such as underground storage facilities a strategic priority.

The policy to develop liquefied natural gas (LNG) production schemes by energy companies in the Middle East and North Africa (Mena) is set to transform the region's midstream outlook, opening up new markets and diversifying revenue stream.

MIDSTREAM PLANS

Faced with an unstable energy demand outlook and looming geopolitical threats, oil and gas producers in the Mena region are ramping up transport and storage capacities.

The *Short-Term Energy Outlook* published in June 2019 by the Energy Information Administration (EIA) reveals that daily oil flow through the Strait of Hormuz averaged 21 million barrels per day (b/d) in 2018, or the equivalent of about 21 per cent of global petroleum liquids

consumption, making it one of the most important searoute routes in the world. The EIA further estimates that 76 per cent of the crude oil and condensate that moved through the strait in 2018 went to Asian markets such as China, India, Japan and South Korea.

Only the UAE and Saudi Arabia have pipelines that can transport crude oil directly outside the Gulf, circumventing the Strait of Hormuz via the Abu Dhabi Crude Oil pipeline (Adcop) and Abqaiq-Yanbu East-West pipeline

(Petroline) respectively. Any disturbances in the Strait of Hormuz could lead to major impediments in global oil and gas trade.

Nearly \$59bn worth of midstream projects are currently planned or underway in the Mena region. Of this, \$22.8bn are under execution. Saudi Arabia leads with \$9.9bn worth of projects under execution, followed by Kuwait (\$4.3bn) and the UAE (\$2.6bn).

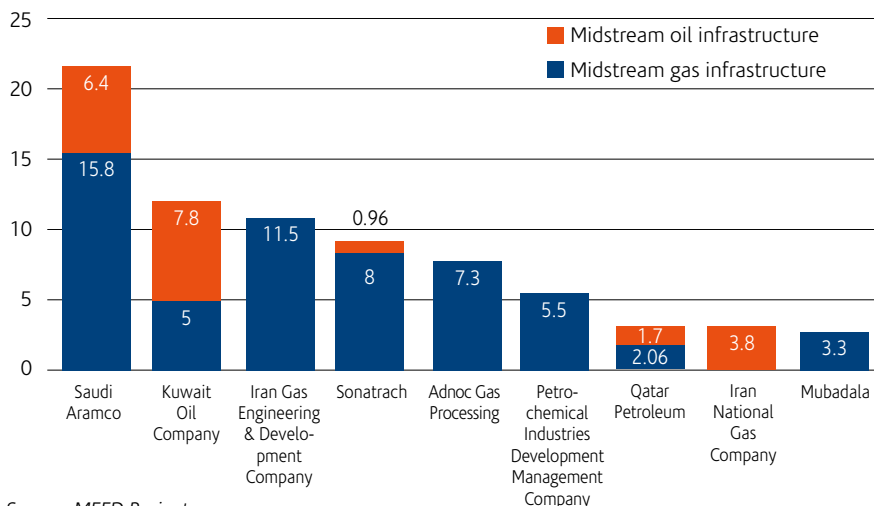
Oil pipelines account for \$24.8bn worth of projects planned or underway, while gas pipelines account for \$10.3bn of projects planned or underway. Of the \$35.1bn active pipeline projects, \$8.8bn are under execution.

LNG infrastructure forms a critical segment of the ongoing midstream infrastructure narrative in the region, as governments increasingly turn to importing gas to meet rising domestic demand. Kuwait's \$2.9bn LNG import and regasification terminal at Al-Zour is the largest midstream project currently under way in the region.

The construction of underground storage facilities by oil majors such as Abu Dhabi National Oil Company (Adnoc) and Saudi Aramco is also a strategic step towards enhancing energy security, while providing greater trade flexibility.

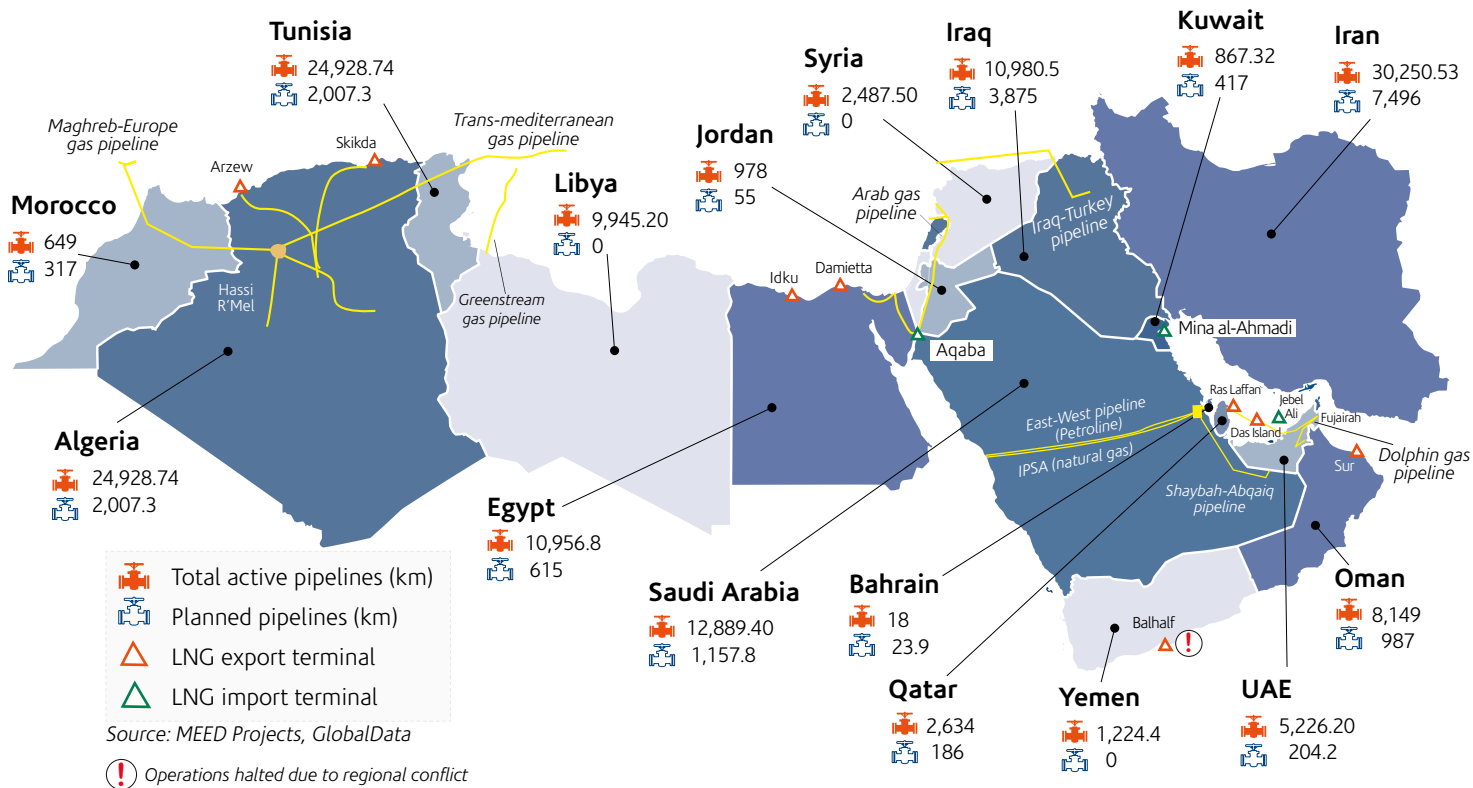
Adnoc and Aramco are also investing in storage facilities in their key export markets such as India and Japan.

Contract awards for midstream infrastructure projects awarded by top oil and gas spenders in the Mena region between 2000-2019 (\$bn)



Source: MEED Projects

Selected midstream infrastructure in the Mena region



INDUSTRY OUTLOOK

As oil and gas production rises across the Mena region, midstream assets are a critical part of the network

ALGERIA

Algeria became the world's first LNG exporter in 1964 and currently has four LNG liquefaction units at Arzew and Skikda. However, gas exports to Europe, its biggest market, are threatened by cheaper Russian supplies and a growing availability of LNG supplies worldwide. State-owned Sonatrach has resorted to increasing its LNG supply to clients and opting for spot sales. In October 2019, Arkad-ABB was

awarded a \$65m contract to expand the existing Medgaz trans-Mediterranean pipeline between Algeria and Spain. Furthermore, Algeria and Tunisia are cooperating on a planned environmental bunkering project, to reduce pollution and spills when ships are fuelled.

BAHRAIN

Bahrain has turned to LNG imports to supplement local gas production and ensure capacity to meet peak seasonal gas demand and industrial growth.

The mechanical construction of Bahrain's first LNG regasification terminal was completed in January 2020. Bahrain LNG is a joint venture of Nogaholding, the investment and development arm of Bahrain's National Oil & Gas Authority (Noga), and a consortium of Teekay LNG Partners, Gulf Investment

Corporation and Samsung C&T. The terminal, whose start-up has been delayed at least thrice, is expected to begin operations in February 2020.

EGYPT



In 2018, Egypt halted LNG imports, following the start of production from its giant Zohr gas field and achieving gas self-sufficiency. Today, Egypt is a net exporter of gas and has raised capacity of its LNG plants at Idku, Damietta and Ain Sokhna.

In 2019, the Idku liquefaction plant reached its full export capacity of 1.1 bcf/d for the first time since 2013, according to state-owned Egyptian National Gas Holding Company.

Egypt is also working with Cyprus on a subsea pipeline project to transport natural gas from the latter's vast Aphrodite field to the Idku terminal, for further exports to Europe.

IRAN



Recent years have seen state-owned National Iranian Oil Company (NIOC) attempt to build

LNG infrastructure in Iran, but international sanctions, lack of investment and technology have made it difficult to set those plans in motion. Iran is now planning to build small and medium-sized LNG facilities such as Kangan LNG plant, although progress has been limited.

Iran also plans to deliver two pipelines: a gas pipeline to export gas to Oman and a crude oil pipeline to supply Iraq. However, both projects are still in early stages of planning.

Work is under way on the \$1.8bn crude oil pipeline from Goreh to the port of Jask, allowing Iran to bypass the Strait of Hormuz. A crude oil export terminal is being built at Jask, with an export capacity of 1 million barrels a day (b/d) and an initial 20 million barrels of crude storage capacity. Iran-based Petro Omid Asia was appointed as the main contractor for both projects.



IRAQ

Pipeline projects came into focus in Iraq in 2019 after attacks on oil tankers

in the Strait of Hormuz. The majority of Iraq's oil exports are transported via tankers through the Strait of Hormuz and a blockade for any reason is likely to spark an economic crisis in Iraq.

Iraq's biggest active midstream project is the \$4bn crude oil pipeline connecting Basra in Iraq to Aqaba in Jordan. The 1 million b/d pipeline is a critical new outlet for Iraq's growing crude oil production, which relies heavily on export infrastructure at the southern terminals around Basra.

The Basra-Aqaba pipeline project was first launched in 2010, but has since suffered delays due to financial troubles. Iraq's Oil Ministry has currently set a May 2020 deadline for EPC bids.

JORDAN



Jordan has been heavily reliant on its neighbouring countries to meet its oil and gas needs, and has

had to spearhead projects such as the Basra-Aqaba pipeline. It imports LNG through the Aqaba terminal from Israel, but may soon turn to imports from Egypt and Cyprus.

Egypt used to supply gas to Jordan under a long-term contract with Jordanian state-owned power utility Nepco, but flows were halted from 2011 onwards, partly due to attacks on the pipeline, and later due to a drop below contractual volume in the flows, as Egyptian domestic production failed to keep pace with rising consumption. The pipeline switched to reverse flows towards Egypt from 2015.

However, Jordan's pipeline gas imports from Egypt have been increasing since 2019 since the discovery of several major gas fields in Egypt.

KUWAIT



Gas imports were originally seen as a stop-gap solution to Kuwait's gas deficit. However, failure to

increase gas production has led to the government moving ahead with the construction of a permanent LNG import terminal. Work is currently under way on a \$2.9bn LNG and regasification terminal at Al Zour.

Qatargas has been supplying Kuwait with the majority of its LNG requirements for the past five years, through both direct sales to state-owned Kuwait Petroleum Corporation (KPC) as well as spot traders.

MOROCCO



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.

As part of production concession award at Tendirara, UK-based Sound

Energy is planning to build and operate a 120-kilometre Tendirara Gas Export Pipeline (TGEPE). TGEPE will carry the gas produced at Tendirara to GME, to be used either for domestic gas-fired power or for export to Southern Europe.

In future, Morocco will see additional imports via the LNG import terminal at Jorf Lasfar, however developer ONEE is yet to award the contract for the project.

OMAN



In October 2018, Muscat announced plans to

extend the lifespan of its LNG facilities and raise LNG production capacity by 10 per cent to 11.4 million tonnes a year (t/y) by 2022. The announcement reflected a major turnaround in Oman's gas industry, which in 2016 was seriously thinking about cutting its LNG production as it struggled to meet rising domestic gas demand.

Oman has been able to export small quantities of LNG to customers in Asia, although rising industrial and household demand for power at home has led to Muscat having to import some gas from Qatar through the Dolphin pipeline.

Meanwhile, feed works are underway on the first phase of the Ras Merkaz crude oil storage park in Duqm, which will have a capacity of 26 million barrels of crude oil upon completion in 2020.

QATAR



Qatar is the largest producer of LNG in the world, producing nearly 77 million tonnes in 2019. Qatar is a

significant player in the European LNG market. Qatar Petroleum (QP) currently operates three mega LNG trains. In September 2018, QP undertook the North Field Expansion project, which includes the addition of a fourth train. This, along with the debottlenecking of the existing trains, will take LNG production to 126 million tonnes a year by 2027.

However, Qatari exports face adverse geopolitical circumstances, and could face disruption amid escalating tensions between the US and Iran. Iran has previously threatened to blockade the Strait of Hormuz, with any closure or limitation of shipping through this area likely to impact global LNG supply.

Qatar is also one of the world's leading NGL producers. QP alone operates four NGL plants and NGLs are exported from Ras Laffan.

QP has also commenced Very Low Sulphur Fuel Oil (VLSFO) bunker supply operations at Ras Laffan Industrial City Port, initiated ahead of the IMO 2020 regulation for a 0.50 per cent global sulphur cap for marine fuels, which came into effect on 1 January 2020.

SAUDI ARABIA



The 1,200km-long East-West crude oil pipeline (Petroline) from Abqaiq to Yanbu on the kingdom's Red Sea coast, is the largest oil pipeline in Saudi Arabia, and one of the biggest in the world. The network provides access to the Red Sea and an alternate to the Strait of Hormuz, which has been rife with security risks.

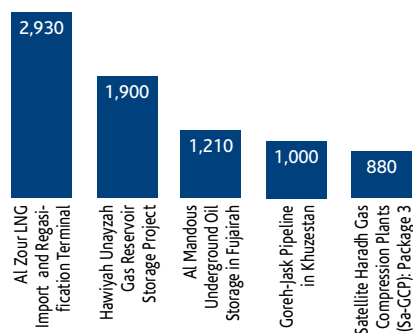
Saudi Arabia ships about 10 per cent of its total crude exports to Europe through the line, which is also critical to Saudi Arabia's own Red Sea refineries. These are mainly supplied with crude oil produced in its Eastern region shipped from the Gulf. Studies are under way to further expand the pipeline.

As the world's leading oil exporter, Saudi Arabia has focused on developing a strong export infrastructure. About 70 per cent of Saudi Arabia's oil output is shipped out of the Ras Tanura and Juaymah terminals.

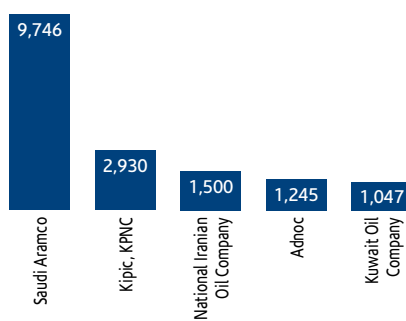
Aramco has undertaken separate projects to upgrade tank farms at the Juaymah oil terminal complex in Saudi Arabia's Eastern Province and at the Yanbu oil terminal. In 2018, Aramco tendered a project at the Juaymah terminal to boost the facility's crude export capacity and improve operational efficiency.

MIDSTREAM IN THE MENA REGION

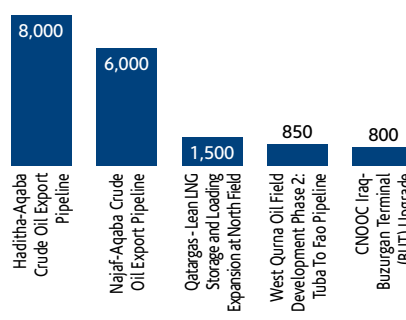
Top projects under execution (\$m)



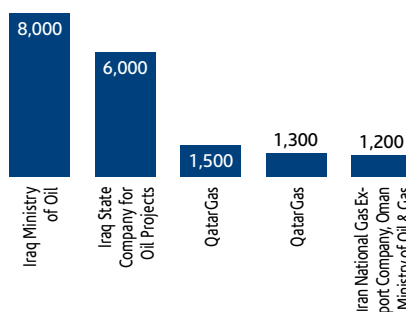
Top project owners by value of projects under execution (\$m)



Top projects in advanced pre-execution* (\$m)



Top project owners by value of projects at advanced pre-execution* (\$m)



Source: MEED Projects

In mid-January, South Korea's Samsung Engineering commenced works on its \$1.9bn EPC contract for Saudi Aramco's Hawiyah Unayzah underground gas storage project.

UAE



Abu Dhabi National Oil Company (Adnoc) is pursuing an intense campaign to increase its strategic crude storage portfolio at home and abroad.

In January 2020, Abu Dhabi's Supreme Petroleum Council, represented by Adnoc, signed an agreement with Japan's Agency for Natural Resources & Energy to expand its existing storage facility in Southern Japan.

Adnoc also signed a MoU with the Indian Strategic Petroleum Reserves Limited (ISPRL) to explore the possibility of storing Adnoc crude oil at ISPRL's new oil storage facility in the southern Indian state of Karnataka.

Meanwhile, South Korea's SK Engineering and Construction was awarded a \$1.21bn EPC contract for the world's largest single underground oil storage project that Adnoc is building in Fujairah. The emirate is a critical asset to Abu Dhabi as it sits on the Eastern coast of the UAE and allows an alternative trading route to the Strait of Hormuz.

Work is also under way on the second storage facility by Fujairah-based mid-stream firm Brooge Petroleum and Gas Investment Company (BGPIC). Phase 2 of the facility, when commissioned in Q4 2020, will take BGPIC's total storage capacity to 1 million cubic metres.

Adnoc subsidiary Adcop owns and manages a 403km-long crude oil pipeline between Habshan in Abu Dhabi to Fujairah's export terminal, which is already the world's second-largest bunkering port.

Most recently, Adnoc Gas Processing announced a revamp of its gas transport infrastructure for industrial customers across the UAE, particularly in the Northern Emirates. A key plan is to increase the transport capacity of the Taweelah gas compressor station.

* = progressed beyond study

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

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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