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Oil · Gas · Petrochemicals Middle East VOLUME 20 | ISSUE 3 2017

Gulf refiners look to Asia

- → Qatar Petroleum expands its global footprint
- Optimising production with a new form of pressure regulation
- A positive outlook for **MENA energy** investments?
- The growing market for storage and bunkering
- Transforming the oil and gas industry through digitalisation

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➔ Editor's note

IN THIS ISSUE we focus on the refining and chemicals sector, highlighting some of the trends that will affect global refining activity and crude/product trade in the coming years (see p18). A significant trend is the shift towards Asia, which will be the focus of future demand. This also comes out in our interview with Bakheet S. Al-Rashidi, president and CEO of Kuwait Petroleum International (KPI), who outlines the company's plans to significantly expand refinery capacity in Asia and share best practice with the region (p.24).

We also look at Qatar Petroleum's efforts to reinforce its dominance in the LNG market and consolidate its operations (p.12), the growth of Fujairah as a storage and bunkering hub (p.28) and prospects for MENA energy investments (p16). While our technology section covers areas ranging from corrosion protection and developments in meter technology to a new method of pressure regulation that can help companies to do more with less.

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APRIL			
26-27	StocExpo Middle East Africa	DUBAI	www.stocexpomiddleeastafrica.com
MAY			
2-4	GPCA Supply Chain Conference	DUBAI	www.gpca.org.ae
3-5	23rd International Energy & Environment Fair	ISTANBUL	www.icci.com.tr/en
5-8	Offshore Technology Conference (OTC)	HOUSTON	www.otcnet.org
6-9	International Oil, Gas, Refining & Petrochems Exhibition	TEHRAN	www.iran-oilshow.ir
9-10	Offshore Arabia	DUBAI	www.offshorearabia.ae
17-18	Qatar HSE & Fire Safety Conference	DOHA	www.hse-forum.com/qatar
22-23	Iraq Petroleum	LONDON	www.cwciraqpetroleum.com
23	EIC Connect Oil & Gas UAE 2017	ABU DHABI	www.the-eic.com/EICConnect
31-1 June	Caspian Oil & Gas	BAKU	www.caspianoilgas.az
JUNE			
12-15	EAGE Conference & Exhibition	PARIS	www.eage.org
28-29	ICORSM	DUBAI	www.waset.org/conference/2017/06/ dubai/ICORSM

Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.

OTC 2017 to push for better upstream cutting-edge technologies

SOME OF THE best opportunities for upstream companies to move forward during this downturn will be represented through the new technologies and processes discussed and displayed at the Offshore Technology Conference (OTC) in Houston from 1-4 May 2017.

This year's event features more than 300 technical papers from leading upstream firms, more than 60 technical sessions, 24 topical breakfasts and luncheons, along with several in-depth panel discussions.

New projects, technology and exploration

A theme that will permeate OTC's technical programme is updates on worldclass projects, including Shell's Gulf of Mexico Stones project, billed as the world's deepest subsea development. Low oil prices have created new demand for lower cost ways to support such projects and that in turn is driving development of breakthrough technologies. Technologies that will be



The d5 conference was held in conjunction with the Offshore Technology Conference 2016, which hosted over 70,000 attendees from around the world to see the latest technology in the energy industry. (Photo: OTC)

presented at OTC include a new cement integrity evaluation system developed by Baker Hughes and several all-electric subsea systems that will be the focus of an entire technical session. One panel session will feature executives from Chevron, BP, ExxonMobil, BHP Billiton, Statoil and Murphy Oil Corporation that will shed light on companies' plans to explore Mexico's deepwater blocks.

The new and the old

OTC will also feature new technical topics that were not on the radars of E&P professionals a decade ago. The digital revolution has hacked its way into the programme, which will closely examine the issues of big data and the growing importance of cybersecurity.

James Pappas, an OTC programme sub committee vice-chairperson representing the Marine Technology Society, said the committee also selected thought-provoking technical papers that match the dual industry needs of safety and improved economics. "These papers, and the sessions in which they are a part of, provide insights into cutting-edge technologies that will result in more efficient and safer operations."

Professional touch

Paul Jones, member of the OTC board representing SPE, explained, "OTC is important because it is the premiere venue to see and learn about new technologies and expand your professional networks," adding that the conference is "a must-attend event at any time because of the quality of technical papers and expanse of the exhibition."

To foster the growth of attendees' professional skills there will a number of networking events as well as discussions on how to improve business operations. Among this year's returning highlights is the University R&D Showcase, which showcases innovative ideas and emerging technologies from the world of academia. In a separate event, the Rice Alliance Startup Roundup will give 50 young upstream-focused firms a chance to pitch their innovations to potential investors and interested attendees.





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Iran Oil Show to boost international cooperation

THE UPCOMING 22ND Iran International Oil Gas, Refining & Petrochemicals exhibition (Iran Oil Show) will provide a good opportunity for Iranian and international companies to explore avenues for mutual cooperation, as well as to obtain updates on industry developments and government priorities in Iran's promising oil and gas industry. Organised by the National Iranian Oil Company (NIOC), the event takes place at the Tehran International Fairground from 6-9 May.

2,000 participating companies from 35 nations are expected to participate, with seven country group pavilions from Germany, France, China, Republic of Korea, Italy, Russia and Turkey planned. Major players such as Shell, BP, Total, and Eni will be present, as well as prominent officials from the Ministry of Petroleum, NIOC, NIGC, NIPC and NIORDC.

Iran continues to raise output in line with its 3.8mn bpd ceiling under the November OPEC agreement, and Minister of Petroleum Bijan Namdar Zangeneh is reported to have said recently that the new Iranian calendar year will be an "exceptional" one for Iran's petroleum and petrochemical industries with several major projects scheduled to come on-stream, such as new phases of the supergiant South Pars gas field and several petrochemical projects. A number of MoUs have been signed with international companies such as Shell, Total and Gazprom for exploration and development.

For further information see: www.iran-oilshow.ir/English.



Qatar HSE & Fire Safety Conference 2017

AS QATAR PREPARES to host the 2022 FIFA World Cup, the country's construction sector continues to gain momentum as infrastructure developments take shape. According to Qatar Investment Fund, the country is projected to witness investments of US\$20bn in roads; US\$40bn in railways; US\$4bn in stadia; US\$8bn on a deep-water seaport; and an added 10,000 hotel rooms to be built in the upcoming years.

With this comes an increased focus on ensuring the development and implementation of a wellplanned health and safety strategy and regulations for all industries and associated stakeholders.

The Qatar HSE & Fire Safety Conference 2017, to take place from 17-18 May in Doha, Qatar, provides a platform for knowledge sharing across a broad range of relevant topics. These include compliance with environmental and safety regulations; how to prepare for Qatar's new fire safety legislation; safety risk predictive analytics for improved safety performance; PPE and arc flash hazard analytics; evacuation planning; smart safety and security for critical infrastructure; and innovation in heat stress and smoke protection. It will include a keynote address from the Qatar Ministry of Labor on



Qatar is investing US\$4bn in new stadia. (Photo: EQRoy/Shutterstock)

Qatar law and current safety practices, as well as a mock court trial illustrating the workings of the justice system following a serious accident at work.

Confirmed speakers include Waleed Ghanem, head of health & Safety, Arab Engineering Bureau; Paul Williams, Health & Safety senior manager, Qatar Rail; Adel Lawson HSE specialist, Oryx GTL; Samir Hasan, HSE manager, Qatar Fertiliser Co (QAFCO); and Alan Crawford, HSE Specialist, Supreme Committee for Delivery and Legacy, 2022.

For further information see the website at www.hseforum.com/qatar.

StocExpo Middle East Africa

THE MIDDLE EAST and African tank storage sector is developing at a rapid rate, thanks to continued large scale investment, with the UAE alone set to double its storage capacity in the next few years. Fujairah Free Zone is now the second largest bunkering hub in the world, with Vopak Horizon Fujairah soon to add more than half a million cubic metres of capacity, thanks to Project Black Pearl.

Top regional oil companies, tank terminal operators, traders, financiers and regulators will come together on 26 and 27 April at the Dubai World Trade Centre for StocExpo Middle East Africa 2017.



Fujairah is now the second largest bunkering hub in the world. (Photo: Gulf Intelligence)

The two-day conference will address the most significant trends, challenges and opportunities facing the tank storage industry in the Middle East and Africa. Conference session topics will include growth and expansion opportunities across the Middle East, financing, oil price trends and their impact, improving safety, efficiency and resilience, Fujairah's role as a trading hub and many others.

The event also includes an exhibition with more than 100 international and local suppliers showcasing the latest equipment and state-of-the-art technologies.

The event enjoys support from the UAE Ministry of Energy, leading experts in the field and the region's oil majors, ports, terminals and institutions including ENOC, Fujairah Oil Terminal, Hamriyah Free Zone Authority, GPS Chemoil, Gulf Refining Co., Gulf Petrochem, Horizon Terminals, Siddco and Socar Aurora.

Speakers include Christof Rühl, global head of Research, Abu Dhabi Investment Authority (ADIA); Erwin Mortelmans, commercial director, Port of Duqm; Edward Bell, commodity analyst, Emirates NBD Bank; Waddah S. Ghanem, executive director, EHSSQ & Corporate Affairs, ENOC; and HE Sharief Al Awadhi, director general, Fujairah Free Zone Authority.

For further information see the website at www.stocexpomiddleeastafrica.com.

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Forum investment brings multiplexer technology to rental market

FORUM SUBSEA RENTALS have announced that new multiplexer video and data acquisition technology is available to their global rental market following significant investment in MacArtney's EMO range.

The acquisition of Domino-7 Mk II and Nano-Mux multiplexers has been made in response to a growing demand for compact, lightweight designs which deliver enhanced operational efficiencies while supporting a complex array of subsea sensors.

The investment not only expands Forum's extensive range of multiplexers, it brings the newest kit – the Nano-Mux – to the global rental market for the first time.

Richard Main, Operations Manager and Global Asset Manager at Forum Subsea Rentals, said, "We have an unparalleled range of innovative technologies available for rental which were developed by Forum



Nano-Mux in action. (Image source: Forum Energy Technology)

and other third party manufacturers which deliver results to our worldwide client.

Forum Energy Technologies is a global oilfield products company, serving the subsea, drilling, completion, production and infrastructure sectors of the oil and natural gas industry.

Iran and Iraq to lead region's oil production growth

IRAN AND IRAQ will contribute most to Middle East oil production growth from 2016 to 2020, according to recent analysis from Rystad Energy.

According to the energy consultancy, production is expected to remain flat this year, reflecting the OPEC deal to cut production, but is forecast to ramp up from the second half of 2017 and going forward, to reach over 30mn bpd from around 2020.

While Saudi Arabia accounts for around 40 per cent of the region's oil production, Iraq and Iran are the countries where oil production is expected to see the highest growth over the next decade, says Rystad.

Iraq's production growth is underpinned by the launch of the second development phase of the Lukoil-operated Qurna West-2 field, as well as increasing volumes from the Nahr bin Umar field, the second phase of the Majnoon and the third phase of the Halfayah developments. The first phase of the South Azadegan project is expected to contribute to Iran's oil production growth over the next five years, reaching a plateau of 255,000 bpd from 2021.

Saudi Aramco signs MoUs with ADNOC, Masdar on energy and technology collaboration

SAUDI ARABIAN OIL Company (Saudi Aramco) has signed two separate MoUs with Abu Dhabi National Oil Company (ADNOC) and with Masdar, Abu Dhabi's renewable energy company, covering energy and technology collaboration, renewables, and carbon management. The agreement was signed by UAE Minister of State and



Saudi Aramco and ADNOC's CEOs. (Image source: Saudi Aramco)

President and CEO of Saudi Aramco Amin H Nasser. Under the terms of the agreement, ADNOC and Saudi Aramco will collaborate on identifying technologies that

ADNOC Group CEO HE Dr Sultan Ahmed Al Jaber and

could deliver improved operational performance and efficiency across the oil and gas value chain. Saudi Aramco has also signed a Memorandum of Understanding (MoU) with Masdar. Under the terms of the agreement, Masdar and Saudi Aramco will collaborate on sustainable development and renewable energy to yield advancements in clean electricity generation, and carbon capture for Saudi Arabia, the UAE and the world.

Commenting on the MoU, Yasser Mufti, executive director for new business development at Saudi Aramco said, "Saudi Aramco welcomes the MoU with Masdar. We are embarking on an ambitious programme in sustainable energy, including renewables and CO₂ capturing and are also supporting the research and development efforts of various organisations and institutes in the Kingdom to promote renewables use in power generation and water desalination."

Air Liquide signs contract with Orpic in Oman

AIR LIQUIDE AND Oman Oil Refineries and Petroleum Industries Company (Orpic), Oman's national refining company, recently signed a long-term agreement for the supply of nitrogen to the Liwa Plastics Industries Complex (LPIC).

The deal will supply a new plastics production complex including the country's first steam cracker Orpic is adding to its existing production facilities, in Sohar industrial port area in Oman. Investing around US\$25mn in a production unit with a total capacity of 500 tonnes of nitrogen per day, Air Liquide will strengthen its leadership position in a key industrial area to support the growth of its customer Orpic.



Expected to start operations in the first quarter of 2019, the new nitrogen plant, along with the expansion of Air Liquide's existing pipeline network, will supply nitrogen for the customer's plastics production complex expanding to a capacity of polyethylene and polypropylene of 1.4 mn tonnes per year.

The nitrogen production unit will be designed and built by Air Liquide's Engineering and Construction teams. It will be owned and operated by Air Liquide Sohar Industrial Gases Company.

François Jackow, a member of the Air Liquide Group's Executive Committee, supervising Africa, Middle East, and India, said: "We are pleased to strengthen our relationship with a strategic petrochemical player such as Orpic. Air Liquide demonstrates its ability to continue capitalising on its existing assets, such as its pipeline network located in the most dynamic industrial basin of Sohar. With this new nitrogen supply contract, Air Liquide will support the development of the petrochemical industry in Oman."

Christiaan van der Wouden, Chief Operating Officer of Orpic, said, "Orpic is pleased to expand its collaboration with Air Liquide and to secure the highest competitive, reliable and safe supply of nitrogen to the Liwa plastics Industries Complex (LPIC) project, which is critical to the development of a downstream plastics industry in Oman."

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Second major contract signing boosts ENOC refinery expansion

ENOC GROUP HAVE signed an agreement with Rotary Engineering Fujairah FZE to construct 12 new storage tanks as part of its plans to expand the capacity of its Jebel Ali refinery by 50 per cent.

The expansion project comprises three separate packages at an estimated value of US\$1bn and the expected date for commercial production is Q4 of 2019. The second package of the expansion will also see the construction of a 31,000 sqft warehouse.

This follows the announcement of the major EPC contractor signing in September last year for the design and construction of new processing units and ancillary units.

The 12 new tanks with a capacity of 450,000 sq m are designed to meet the latest and highest industry standards to help maintain high product quality throughout the refinery's logistics chain. The tanks are



The contract signing ceremony

designed to store jet fuel and naphtha along with gasoline blend stocks.

His Excellency Saif Humaid Al Falasi, group CEO of ENOC, said, "Our US\$1bn expansion project at the Jebel Ali refinery is a key part of the UAE's downstream strategy to be selfsufficient in domestic fuels, as well as expanding the slate of products on offer for export. The production capacity of our Jebel Ali refinery is 140,000 bpd helping to meet the requirements of local, regional and international markets. With expansion, we hope to achieve an increased capacity of 210,000 bpd. This will help us address the needs of the market and the wider industry, which has witnessed considerable changes in recent times."

Mr Roger Chia Kim Piow, chairman and managing director of Rotary Engineering Limited commented, "Rotary is proud to be chosen by the

ENOC Group to participate in its milestone project. Over the years, Rotary has forged a reputation built on providing quality services that consistently meet our clients' needs and expectations through excellence in our operations. Our work with ENOC once again testifies to our ability to deliver projects of the highest standards. Rotary looks forward to working closely with the ENOC team to successfully executing a world-class project."

Oil and Gas Big Data Project launched

THE OPEC SECRETARIAT and UAE Ministry of Energy have announced the launch of the first phase of the Oil and Gas Big Data Project, which will take place during the 3rd GCC Petroleum Media Forum in Abu Dhabi on 19–20 April 2017.

Today, large volumes of granular oil and gas data are readily accessible to the public on various platforms, as well as through the media. However, the available data are rarely used collectively and in an optimal manner, due mainly to the lack of data ubiquity and data centralisation and a unifying tool that is both comprehensive and simple enough to take advantage of the plethora of data. Such a tool needs to enhance the understanding of the messages that big data conveys, as well as take on board the complex and often multidimensional interactions of data and advance overall transparency.

To help satisfy this need, the OPEC Secretariat and the UAE Ministry of Energy have embarked on the Oil and Gas Big Data Project, aimed at developing a sophisticated, comprehensive and easy-to-use multi-dimensional big data tool for analysing publicly available oil and gas data.

The platform will consist of a set of high standard analytic tools, employing data-driven approaches, optimisation and statistical analysis techniques, as well as interactive maps, charts and data tables, which will be presented on a user-friendly IT platform. The facility will initially be linked to publicly available relevant oil market databases and will have the capacity to display raw figures, cross-comparing time series between countries, flows and products. Future planned expansions of the project will introduce advanced information technology, web and text mining techniques, as well as statistical, econometric and optimisation methods.

The Oil and Gas Big Data Tool has the potential to fill the existing data analytics gap, placing available oil and gas data at the fingertips of market stakeholders.

The results of the first phase of the project are expected to be presented during the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) on 13-16 November 2017, during which time a second phase will be launched.





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Mergers and **cquisitions**

Qatar Petroleum is lifting its moratorium on the development of the North Field in a bid to strengthen its position in the global LNG market, while the consolidation of some of its major business units will take a giant leap forward in 2017. Martin Clark reports.

ATAR PETROLEUM'S COST-CUTTING and restructuring drive continues at home, but that doesn't mean the state-owned energy company is in retreat – far from it. Despite the consolidation and repackaging of QP's various divisions within Qatar, the company is maintaining a proactive stance with regards to opportunities overseas.

The most significant change at home, of course, comes in the LNG sector, where Qatar remains the world's biggest producer, at least for now.

QP's chief executive, Saad al-Kaabi announced in early April that it is lifting its selfimposed moratorium on the development of the North Field, the world's largest natural gas field, which Qatar shares with Iran. The selfimposed ban has been in place since 2005 to give Doha time to study the impact on the reservoir from a rapid rise in output. The North Field accounts for nearly all of Qatar's gas production and around 60 per cent of its export revenues.

The new development will be located on the southern sector of the North Field with a capacity of two billion cubic feet per day, or 400,000 barrels of oil equivalent, and will increase production of the field by around 10 per cent when it starts production in five to seven years' time, according to al-Kaabi.

"We expect much of the gas to be targeted for export, although whether that is via regional gas exports, debottlenecking its existing trains or installing new LNG trains is not clear," commented Giles Farrer, Wood Mackenzie's research director, global LNG.

"With global activity levels and costs low, now is a good time to add new capacity, even if the LNG market does presently look over-supplied. By the time new capacity is commissioned in five to seven years' time, new pre-FID LNG supply is likely to be required in the global market.

"It's a signal that Qatar intends to increase its market share, which has been falling as other regions have built new capacity. But it's also a threat to other developers of new



capacity worldwide, as Qatar can add new capacity at a lower cost than anyone else."

Strategic merger

QP officials announced at the end of last year that the group is looking to merge its two giant LNG divisions, Qatargas and RasGas. The merger of the two entities, which group QP with a mix of high profile international investors, including ExxonMobil, is driven primarily by economics, though officials hope there will be other spin-off benefits too.

The strategic drive is intended to save hundreds of millions of dollars following a more than two-year slump in oil prices that has forced Gulf countries to reduce state spending. At the same time, many analysts

What is taking place in the LNG sector is only a part of a much bigger consolidation process." have long said that QP's sprawling structure – with its multiple business units and subsidiaries spanning every corner of the oil and gas sector – was long overdue. The tieup of Qatargas and RasGas was talked about long before the oil price fall.

Certainly, the merger will generate cost savings in the "hundreds of millions of dollars", al-Kaabi said at the time of announcing the move, without giving a timeframe for the savings.

But he also emphasised that there were other advantages too. "It will make us more competitive in the market," he added.

The new single entity will be named Qatargas, with the complex merger expected to be completed before the end of 2017. The existing Qatargas is already the largest single LNG company in the world, with an annual capacity of 42mn tonnes a year (mtpa). QP owns a majority stake, alongside Total, Mitsui & Co and ConocoPhillips with small equity interests.

Separately, RasGas has a capacity of about 37 mtpa, and is a 70/30 per cent joint venture between QP and ExxonMobil.

The merger is also a reaction to shifting



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→ Qatar Petroleum

LNG market dynamics, al-Kaabi added, as more global gas production comes on stream, with Qatar poised to lose its top LNG producer status to Australia possibly this year.

Around 100 mtpa of new LNG capacity will be added by 2020 to the current 300 mtpa output, the minister said. Announcing the Qatargas merger in December last year, he said the establishment of a single entity would "create even higher value for our stakeholders, and enhance our competitive position" within the new LNG sector.

C The company, like Qatar itself, remains keen to expand its footprint overseas."

Consolidation process

What is taking place in the LNG sector is only a part of a much bigger consolidation process, however. In another transaction, QP officials revealed that Qatar Petrochemical Company (QAPCO) will operate the activities of Qatar Vinyl Company (QVC) through a service agreement by the end of this year.

"The integration will reduce operating costs and enhance the profitability of both companies," al-Kaabi said in a February statement.

QVC is part of Mesaieed Petrochemical and QAPCO is a unit of Industries Qatar. QP is the parent company of both Mesaieed Petrochemical and Industries Qatar.

QP also said last year that it would cede control of parts of the industrial city of Mesaieed in 2017 to the Economic Zones Company Qatar, or Manateq. These areas contain various light industries, construction and storage activities, all now deemed noncore oil and gas activities to the new-look QP.

Other major strategic initiatives taking

place under the restructuring process include the integration of both Qatar Petroleum International (QPI) and Tasweeq within QP, plus the establishment of North Oil Company to develop and operate the Al-Shaheen oilfield.

Overseas opportunity

Despite the untangling of QP's myriad subsidiaries, the company – like Qatar itself, generally – remains every bit as keen to expand its footprint overseas.

Qatar's sovereign wealth fund, Qatar Investment Authority (QIA), underscores the state's aggressive deal-making capabilities, announcing plans to open up in Silicon Valley in the USA within a year.

Last year, QIA and commodities trader Glencore also paid US\$10.8bn for a 19.5 per cent stake in Russian oil giant Rosneft. And Qatari investors have also pledged to step up activity in the UK, in the wake of Brexit.

Likewise, QP's appetite for business remains undiminished. Upstream, it was recently granted an exploration block offshore Cyprus, in partnership with ExxonMobil. The pair hope to capitalise on recent eastern Mediterranean gas discoveries both offshore Cyprus – the USA's Noble Energy made Cyprus's first big offshore natural gas find in 2011 with the Leviathan well – as well as offshore Egypt. Morocco's nascent gas sector is also on the radar, al-Kaabi said in February, as the company looks to expand its gas portfolio abroad while trimming costs at home.

"You will see us going internationally with some of the partners we have in Qatar, this year and next year...we are in growth mode," Kaabi told reporters recently at QP's Doha headquarters.

Downstream marketing

As well as boosting its upstream presence in selected markets, QP is also looking to explore further downstream opportunities, including strengthening its hand in the



Ocean LNG has set up a branch office in the Qatar Financial Centre. (Photo: Chinara/Shutterstock)

changing LNG sector.

Earlier this year, it joined an international consortium to develop an LNG import project in Pakistan, together with ExxonMobil, Total, Mitsubishi, and Hoegh. The project includes a floating storage and re-gasification unit, a jetty and a pipeline to shore to provide natural gas supply to energy-hungry Pakistan.

And at the end of 2016, it also created Ocean LNG, another joint venture with ExxonMobil, for the purpose of marketing its future international LNG supply portfolio sourced outside of Qatar. Al-Kaabi said this venture was driven by aspirations to continue to be a global LNG leader, and to invest in LNG projects outside Qatar. A branch office has been set up in the Qatar Financial Centre (QFC) to manage and undertake the activities of Ocean LNG, reinforcing Doha's position as the world's LNG capital, he said.

The announcement was followed by news of Ocean LNG's first contract to supply gas into the Brazilian market, reflecting Qatar's increasingly global spread. Under the deal, Ocean LNG will supply Brazil's CELSE-Centrais Elétricas de Sergipe SA, a joint venture between GG Power and Ebrasil, with 1.3 mtpa of LNG, starting in 2020.

These are indeed changing times for all at QP, but, it seems, QP is similarly becoming adept at changing with them. ■





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Positive outlook for MENA energy investments?

The MENA region will see a number of critical energy projects pushed through in 2017 despite uncertainties that cloud the investment outlook, according to the latest edition of the MENA Energy Investments Outlook published by the Arab Petroleum Investments Corporation (APICORP).

OTAL COMMITTED AND planned investments in the region from 2017-2021 are estimated at US\$960bn – a seven per cent increase over APICORP's 2016 forecast, with committed investments rising by 17 per cent, as contracts are awarded following a more positive outlook.

Despite budget deficits and the tightening of public expenditures, governments in the MENA region will prioritise critical investments in their energy sectors, some to maintain their position as global energy suppliers, some in response to local energy supply shortfalls, says APICORP. The GCC countries, with ambitious programmes throughout the value chain, account for more than 50 per cent of total committed investments, and will be well positioned when prices start to increase.

The total of US\$337bn of committed investments for the five-year period comprises investments in the oil sector at US\$121bn, gas investments at US\$108bn, power investments at US\$91bn and chemicals at US\$17bn.

Saudi Arabia tops the list in terms of committed and planned investments, with a focus on increasing gas production and promoting the role of gas in its energy mix; the US\$6.5bn Fadhili gas plant is one of the largest investments due online towards the end of the outlook period. The Kingdom also plans to continue investing in petrochemicals in its drive to diversify and create more value, with the Jizan refinery scheduled for completion in 2018, while the Jubail Oil-to-Chemical Complex and the Yanbu Integrated Refinery & Petrochemicals Complex are currently under study.

Iran is playing catch-up after years of sanctions, with ambitious oil and gas plans. It is prioritising the development of the South Pars gas field, where around US\$13bn will be invested over the outlook period. In upstream oil, the focus is on the West Karun oilfields, particularly Yadevaran and Azadegan. Major planned projects include the US\$4.5bn Kish gas development and the US\$8.5bn Iran Gas Trunkline, currently at the design phase, which aims to connect Iranian gas to Europe via a proposed pipeline to Turkey. Investments are starting to flow back after years of sanctions but face a number of above ground challenges such as the regulatory environment, political rivalries and the possibility of snap-back of sanctions.

The UAE has major upstream investments in Upper Zakum, and the ADCO consortium, which accounts for more than half of the UAE's oil output, is set to drive up upstream investment further. Oman is prioritising upstream gas; the BP-led Khazzan and Makarem project is the largest gas development in the country, while downstream the US\$4.5bn Liwa petrochemicals plant is due to be completed in 2020, and the Duqm refinery is one of the largest planned projects. Kuwait plans to invest US\$6bn to develop the first phase of heavy crude reservoirs, while downstream projects, notably the Al-Zour refinery and Clean Fuels project, account for more than half of investments currently under execution.

Total planned and committed MENA energy investment 2017-21 (\$bn)





In Iraq investment in upstream development is urgently needed to maintain current high levels of production, but budgetary pressures, security concerns, political uncertainty and a deteriorating business environment will dictate the number of new projects to come. Up to around US\$6bn worth of awarded contracts have been put on hold and a further US\$3bn cancelled since 2014. The ENI-led Zubair and the PetroChina-led Halfaya are two of the largest upstream development projects in the country.

In Egypt recent gas finds promise to meet rising power demand; ENI's recently discovered Al-Zohr field in the Mediterranean will be Egypt's main focus in the medium term, while the BP-led West Nile Delta represents the majority of investment in gas currently under execution. While in Algeria, Sonatrach plans to invest US\$9bn a year in upstream exploration and development to boost production by 20 per cent, although a sharp fall in export revenues is threatening investment programmes.

There are however several challenges and constraints which could prove pivotal in the medium term, says APICORP. The first is the interlinkage of global investments in the oil and gas sector with oil prices, with Iraq in particular continuing to face challenges in executing its ambitious capacity expansion programme.

Project finance continues to be challenging, with political and economic concerns meaning investors to be cautious. Political conflict and instability will deter investment in Syria, Iraq, Libya and Yemen, and investors will be wary of spill-over effects in neighbouring countries.

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The Gulf countries are expanding refinery capacity to increase refined product exports to global markets. (Photo: Anekoho/Shutterstock)

Changing trends in the global refining sector

Moin Siddiqi, economist, looks at some trends that will affect refining activity and crude/product trade in the coming years.

B Y 2021, A total of 7.35mn bpd of new distillation capacity is projected online, of which over two-thirds will be located in Asia Pacific (including China) and the Middle East, with North America and Europe seeing only modest capacity additions over same timeframe, according to OPEC's World Oil Outlook 2016 report. The total estimated additions (distillation and secondary units) require downstream investment of US\$265bn in grassroots projects over the 2016-21 period.

However, potential product output from added capacity could exceed demand growth by some 2.2mn bpd in the medium-term to 2021. Thus, foreseen capacity "overhang" would cause increased pressure on refinery margins.

Four emerging trends will affect refining activity and crude/product trade in the coming years. First, oil use per capita is dropping in advanced countries due to energy efficiency measures, while climate change / new environmental rules – requiring cuts in greenhouse gas (GHG) discharges – have led to increased competition between fossil

The Gulf is well positioned for downstream capacity additions."

energy and renewables (i.e. solar-photovoltaic, offshore wind and nuclear power) in the electricity generation sector.

Second, a regional demand shift is evident, with depleting consumption in industrialised regions, combined with rising oil usage in developing regions (notably Asia).

Third, a gradual change in the energy mix is leading to more demand for non-crude supplies, i.e. gas-to-liquids, coal-to-liquids, natural gas liquids, liquefied natural gas (LNG) and biofuels. Consequently, there is a reduction upon the "call on refining", hence falling oil products off-take.

Finally, tighter product quality specifications require increasing the proportion of fuels to meet low and ultra-low sulphur (ULS) targets. There is a long-term trend in both mature and developing economies to move away from using mostly heavy fuel oil towards light, cleaner products in line with ULS standards for gasoline and diesel.

Today's large and sophisticated refineries are increasingly integrated with multi-tasks, including petrochemical production functions and high levels of upgrading, desulphurisation, octane and other secondary capacities (see box). In terms of secondary units, North America (primarily the USA) boasts the highest upgrading capacity (11.8mn bpd), followed by Western Europe and China at 6.8mn bpd (each), respectively. Thus far, conversion processing capability in Middle East is low (2.8mn bpd), below onethird of total distillation capacity (see Table 2).

Upcoming Middle East projects

The Gulf is well positioned for downstream capacity additions through rehabilitating existing refineries and greenfield projects that will increase refined product exports to global markets. New developments include:

 Saudi Aramco is building a grassroots refinery (area 12 km) at Jazan Industrial City. The new facility – equipped with a state-of-the-art port and a four-gigawatt power plant – will process 400,000 bpd of

Table 1: Refinery nameplate capacity, ('000 barrels daily)*

					% chg.
	2012	2013	2014	2015	2015-12
Middle East & North Africa					
Iran	1,952	1,985	1,985	1,985	1.7
Iraq	971	823	931	933	-3.9
Kuwait	936	936	936	936	-
Qatar	283	283	283	283	-
Saudi Arabia	2,107	2,507	2,899	2,899	37.5
United Arab Emirates	710	710	1,143	1,143	61.0
Algeria	652	647	651	651	-
Egypt	840	840	840	840	-
International comparison					
USA	17,824	17,925	17,889	18,315	2.7
Canada	2,050	1,965	1,965	1,966	-4.1
Brazil	2,001	2,093	2,235	2,278	13.8
Germany	2,097	2,061	2,077	2,032	-3.1
Russia	5,836	6,245	6,352	6,428	10.1
China	11,933	13,304	14,109	14,262	19.5
India	4,279	4,319	4,319	4,307	0.6
Japan	4,254	4,123	3,749	3,721	-12.5

*Atmospheric distillation capacity at year end

Source: BP Statistical Review of World Energy, June 2016



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Table 2: Global refinery	capacity by regi	on, (mn bpd)	, as of Jar	uary 2016					
	USA &	Latin			Russia &	Middle		Asia	
	Canada	America	Africa	Europe	Caspian	East	China	Pacific	WORLD
Distillation									
Crude oil (atmospheric)	20.0	8.0	4.2	17.1	6.6	9.5	13.2	19.0	97.5
Vacuum	9.1	3.6	1.0	6.7	2.8	2.7	5.2	5.8	37.0
Upgrading									
Coking	3.0	0.8	0.1	0.7	0.3	0.3	1.9	0.9	8.0
Visbreaking	0.2	0.4	0.2	1.6	0.5	0.6	0.2	0.5	4.1
Solvent									
De-asphalting	0.4	0.1	0.0	0.1	0.0	0.2	0.1	0.1	1.0
Catalytic cracking	6.1	1.6	0.3	2.4	0.6	0.8	3.0	2.8	17.6
Hydrocracking	2.1	0.2	0.2	2.0	0.3	0.9	1.6	1.5	8.9
Total secondary capacity	11.8	3.1	0.8	6.8	1.7	2.8	6.8	5.8	39.6
Secondary processing									
% of crude oil refining	59.0	38.7	19.0	39.7	25.7	29.4	51.5	30.5	40.6

Source: OPEC World Oil Outlook, November 2016

Arabian heavy and medium crudes to manufacture approximately 75,000 bpd of gasoline, 160,000 bpd of ultra-low-sulphur diesel, 220,000 bpd of fuel oil and over 1mn tonnes/year of benzene and paraxylene petrochemical products. It is expected onstream in 2018.

- Aramco and Sabic have commissioned a feasibility report for a fully integrated crude oil to chemicals project – estimated cost US\$30bn. Aramco is also expanding its PetroRabigh refinery/petrochemical complex, as well as constructing clean fuels plants at Ras Tanura and Riyadh refineries – which were deferred due to weaker oil prices over 2015-16.
- In Kuwait, a key greenfield project is the 615,000 bpd oil refinery at Al-Zour (in the Neutral Zone) – completion scheduled for late 2019. The refinery and associated petrochemicals facility (estimated cost US\$16bn) will produce low-sulphur residual fuel for power generation, among other functions. The US\$14bn Clean Fuels Project due online 2018-19 is designed to transform two large refineries (located 10 miles apart) at Mina Abdullah and Mina Al-Ahmadi into an integrated merchant

Table 3: Recent and projectedadditions to global refining capacity

Year	mn bpd	
2014	1.30	
2015	1.20	
2016	0.85	
2017	1.10	
2018	1.10	
2019	1.75	
2020	1.30	
2021	1.35	

Source: OPEC World Oil Outlook, November 2016

Middle Eastern refineries need US\$20bn in investment in the years to 2025."

refining complex. There will also be substantial additions to desulphurisation and hydrocracking capacity. Both megaprojects should expand Kuwait's refining capacity by over half to 1.4mn bpd by 2020.

- The UAE is pursuing a number of projects

 some underway or at advanced planning stages. An expansion of Ruwais facility at Abu Dhabi Oil Refining Co. (Takreer) doubled the refinery's distillation capacity to 417,000 bpd in 2015. The Jebel Ali 120,000 bpd condensate refinery is being upgraded to produce extra 20,000 bpd of refined products to Euro-5 standards. In Fujairah, a 200,000 bpd grassroots refinery is at early engineering and design stages.
- **Oman Oil Refineries & Petroleum Industries** Co. (ORPIC) has completed all mechanical construction and pre-commissioning works on the brownfield Sohar Refinery Improvement Project (SRIP) to technically enhance the operator's existing 116,000 bpd nameplate capacity. Upon reaching full operation, the newly expanded Sohar refinery will process 198,000 bpd of crude into over 13mn tonnes/year of finished products. Besides revamping of existing residue fluidised catalytic cracker, SRIP also entails installing five new units at the refinery, including an 82,000 bpd distillation unit, vacuum distillation unit, delayed coker, hydrocracker, and bitumen-blowing unit, according to ORPIC.

 Qatargas has inaugurated the US\$1.5bn Laffan Refinery-2 in Ras Laffan Industrial City, effectively doubling emirate's condensate refining capacity to 292,000 bpd. Designed to operate at reduced emission levels and with zero flaring, the new refinery processes condensate from the super-giant North Field (the world's biggest gas field) to produce Euro-V



*Total additions from existing projects (2016-21) is estimated at 7.3mn bpd

Source: OPEC World Oil Outlook, November 2016

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specifications products: naphtha, kerojet (A-1), ultra-low sulphur diesel and propane/butane and jet fuel.

- Iraq aspires to monetise vast oil reserves, which were recently revised to 153bn barrels, by developing its downstream industry, but continued turmoil has put ambitious plans on hold. However, Iraq is in negotiations with foreign investors to build four new refineries with a total capacity of 750,000 bpd. These include the US\$6bn refinery in the southern border province of Missan by a consortium of Swiss Co. Satarem and Wahan Co. of China, and refineries in Nassiriya, Kirkuk and Karbala. Start-up dates for these grassroots refineries are uncertain.
- Iran needs to upgrade/modernise ageing refineries and construct new ones, such as a 480,000 bpd gas condensate refinery situated at Assaluyeh, installed with eight 60,000 bpd processing units, plus a condensate splitter project (the Persian Gulf Star) in Bandar Abbas – built in three stages of 120,000 bpd each. Additionally, National Iranian Oil Refining & Distribution Co. has reportedly implemented upgrade projects at Abadan, Isfahan and Tabriz refineries.

The largest portion of new refining investments by 2021 is expected in the Middle East."

According to US-based energy consultancy IHS, Middle Eastern refineries need US\$20bn in investment in the years to 2025 to meet anticipated new demand for refined products – beside US\$40bn already committed for the period.

Foreign expansion

Middle Eastern NOCs, with foreign partners, are working on new refineries in the Asia Pacific area. Sinopec, Aramco and ExxonMobil are planning a 300,000 bpd refinery in China's Fujian province; and PetroVietnam, in collaboration with Kuwait Petroleum and Mitsui Chemicals (Japan) are building a 200,000 bpd refinery in Nghi Son, Vietnam – slated for completion in 2018.

Among the most advanced projects is the US\$4-5bn PT Pertamina (Indonesia) and

Chart 2: Cost of refinery projects by region, 2016-2021 US\$bn 15 52 30 20 10 50 29 59 USA & Canada Latin America Africa Europe Russia & Caspian Middle East China Asia Pacific

Source: OPEC World Oil Outlook, November 2016



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Aramco project to upgrade and expand the Cilacap refinery in Java – aimed at boosting processing capacity to 370,000 bpd. It also entails raising output capacity of aromatics and polypropylene to over 600,000 and 160,000 tonnes per annum, respectively, as well as maximising output of gasoline/diesel volumes that meet stringent emissions standards. Front-end engineering design is due for completion in 2018, with engineering, procurement, and construction activities starting thereafter. The project is expected to be completed by 2022. In sum, according to OPEC data, the Middle East has added 1.4mn bpd of refining capacity since 2010. The rate of medium-term additions is projected at 1.7mn bpd, comprising around a quarter of total distillation expansions. Overall, the largest portion of new refining capacity investments by 2021 is expected in the Middle East, with almost US\$60bn. This exceeds a fifth of the global investment total. Downstream expansions are driven by oil exporters' strategy to achieve greater value-added from oil through a sophisticated refinery base in the region.



Processing units

Coking is a refinery unit operation to upgrade crude oils into higher-value products and produces petroleum coke – a coal-like material. Two types of coking processes exist – delayed coking and fluid coking. Both are physical processes that occur at pressures slightly exceeding atmospheric and at temperatures above 900°F, which thermally crack feedstock into products such as naphtha and distillate, leaving behind petroleum coke.

Visbreaking refers to the process of reducing the viscosity of a liquid through high temperatures. This is a type of thermal cracking that works by breaking the molecular bonds of the liquid. There are two known technologies for inducing visbreak: coil and soaker. Refineries use the visbreaking process to convert crudes into middle distillate by-products (mainly gasoline and petroleum).

By increasing the amount of middle distillates in the feed-stream, the refiner boosts its profits. Residues from visbreaking process include tar and coke – used for diverse purposes like roofing and manufacture of dry cells.

Solvent de-asphalting is a process to extract asphaltenes and resins from heavy vacuum gasoil, atmospheric residue, vacuum residue, or other petroleum-based materials to produce valuable deasphalted oil that cannot be recovered from the residue via other refinery processes. The deasphalted oil can be used to make lubricants or as feedstock for fluid catalytic cracker, hydrocracker, units.

Fluid catalytic cracking (FFC) produces higher yields of petrol and liquefied petroleum gas. It is used to convert highboiling, high-molecular weight hydrocarbon fractions of crude oils into more valuable gasoline, olefinic gases, etc. Modern cracking uses zeolites as the catalyst. FCC units also produce high volumes of branched alkanes and aromatic materials like benzene.

Hydrocracking is a catalytic chemical process used for converting the highboiling constituent hydrocarbons in crude oils into more valuable lower-boiling products such as gasoline, kerosene, jet fuel and diesel oil. The process takes place in a hydrogen-rich atmosphere at elevated temperatures (260-425°C) and pressures (35-200 bar). Thus, hydrocracking products are essentially free of sulphur and nitrogen impurities and consist mostly of paraffinic hydrocarbons.



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Ambitious expansion plans

Oil Review Middle East speaks with Bakheet S. Al-Rashidi, president and CEO, Kuwait Petroleum International (KPI).

How is KPI adding value to Kuwait's oil and gas resources?

KPI is the international downstream arm of parent company, Kuwait Petroleum Corporation (KPC), and we add value by securing outlets for Kuwaiti crude and adding high-conversion refining capacity in expanding Asian markets.

Europe has been our key market for more than three decades, and it is our plan to strengthen our position there by improving the efficiency of our current operations. Our recent growth in Europe was 15 per cent, which is a very high percentage if you consider the declining demand in the region. In 2015, European demand for petroleum products declined 11 per cent, and in 2016, it dropped another 16 per cent. Yet we have been able to increase our market share because we concentrate mainly on countries where we operate: Italy, Belgium, the Netherlands, Luxembourg, Sweden, Denmark, and Spain. In these countries, we are also enhancing our international tools and value-added services to meet the fueling needs of international road transport companies and retail customers.

As for expanding our refining capacity, our goal is to reach an international refining capacity of 800,000 bpd by 2030, and Asia is our focus for this expansion. We are progressing well with the construction of our US\$9bn JV project in North Vietnam. We are nearing completion of our Nghi Son Refinery & Petrochemicals Project (NSRP for short, http://www.nsrp.vn/home), and we expect our refinery to be commissioned

C Our goal is to reach an international refining capacity of 800,000 bpd by 2030, and Asia is our focus for this expansion."



The Q8 brand has played a vital role in building KPI's reputation in the European markets

by year end. We are also invested in expanding our refining capacity through a JV with GCC member and partner, Oman.

What is your current strategy for development, and are there any key projects you would like to highlight?

Currently, there are three main elements to refining success:

- 1. Large enough capacity to compete with an economy of scale;
- 2. Complex and sophisticated in refining process configuration; and
- 3. Geographical presence in a region of high growth.

In Asia, all three key elements are present, and this is why are expanding our refining capacity there. A perfect example of this strategic fit is our newest JV with Oman Oil Company (OOC), the Sultanate's investment arm in the energy sector, to develop the Duqm Refinery and Petrochemical Complex.

The project is sited in the special economic zone in Duqm, in Al Wusta region. It is one of Oman's most significant undertakings in the energy field and is expected to have a processing capacity of around 230,000 bpd. As well as supporting the economy by developing the region, it will also provide a significant long-term outlet for Kuwaiti and Omani hydrocarbons.

As for our operations in Europe, our objective is to position the retail business at top tier level to ensure sustainable competitiveness and enhance existing portfolio performance. Over the past three decades, our brand, Q8, has played a vital part in building our reputation as a dynamic

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company in the European markets. Our network of more than 4,000 fuel stations extends across Europe, and we position the strength of our retail offering by forging partnerships with regional market leaders such as the supermarket chain Delhaize.

We have also taken some strides to provide cleaner fuel to ensure our competitiveness and to work with the communities where we operate on minimising damage to the environment. Our service stations are characterised by innovation and environmental sensitivity. In Sweden and Italy, we have launched the world's most sustainable service station and we are extending the concept of retail outlets with near zero environmental impact across our network. Our operations in Belgium have

The future demand will be in the East, especially for petroleum products and other related services." opened their first service station to offer Compressed Natural Gas (CNG) in Schoten, near Antwerp, with four more service stations on the way.

What is the rationale behind KPI's Asia expansion?

The future demand will be in the East, especially for petroleum products and other related services. In Vietnam, the number of cars is growing very quickly, up to 8 per cent per year. Vietnam, India, and the East Asian region are expected to continue with their demand growth, especially in transportation and aviation, and we aim to be there to meet our customers' needs.

How are you sharing best practices with Asia?

Kuwait Petroleum offers deep industry knowledge of refinery integration with petrochemicals. Our refining expertise has transformed from being a field of local sharing to a best practice we share with our partners. We can see best practice sharing at its best in our JV refinery in Vietnam. We have created synergies with our JV partners, whereupon they rely on our strength in refining and



Bakheet S. Al-Rashidi



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maintenance, and we rely on theirs in petrochemicals and technology. Our aviation fuel business, Q8Aviation (www.q8aviation.com) also provides technical services and advice on jet fuel handling and storage with major operators in Vietnam, Thailand, Singapore and the Philippines.

Petroleum research is also a very important part of our business and our research and development centre, Q8Research (www.q8research.com) is a leader in providing best practices on product development, product specification and quality control, especially in the fields of lubricants, jet fuel, and transportation fuel. While its client base is mainly in Europe, we are looking into ways to expand our scope of services to the GCC.

On a regional level, I would like to highlight another endeavor focused on our keen interest in knowledge sharing. KPI, together with sister company and Kuwait National Petroleum Company, have recently ioined forces with Saudi Aramco and Bahrain Petroleum Company to be the founding members of the new Gulf Downstream Association (GDA). The aim of this non-profit organisation is to share best practices in the downstream industry. In my capacity as Chairman of the GDA. I intend to focus on supporting companies involved in refining, marketing refined products and related industries such as gas processing, giving our members a solid platform from which to address issues related to the downstream business.

The Nghi Son Refinery & Petrochemical Project in North Vietnam is one of the largest and most exciting projects in Q8's history."

Can you tell us about the new refinery in Vietnam which you will shortly be commissioning, and how it will contribute to KPI's strategy of expanding the marketing of your products?

As mentioned earlier, we are close to commissioning the Nghi Son Refinery & Petrochemical Project (NSRP) in North Vietnam during mid-2017. It is one of the largest and most exciting projects in Q8's history. NSRP is a joint venture between Q8 and partners PetroVietnam, Idemitsu Kosan and Mitsui Chemicals, to construct Vietnam's largest refinery with a daily refining capacity of 200,000 barrels per day, and has been designed to increase Kuwaiti crude refining by 100 per cent.



The Nghi Son Refinery & Petrochemicals Project in North Vietnam is expected to be commissioned by year end

We have also launched a JV with our refinery partners, Idemitsu Kosan, called Idemitsu Q8 Petroleum Limited Liability Company (IQ8 for short) with the purpose of distributing petroleum products in Vietnam. We have obtained the necessary approvals from the Vietnamese Government to launch our retail and wholesale operations, mainly through the construction and management of service stations across Vietnam.

Named Idemitsu Q8 Petroleum LLC, the new company, will promote wholesale and retail sales of petroleum products, mainly through constructing and managing a network of service stations across Vietnam.

The joint venture company officially established its head office in Hanoi on 15 April 2016 and is planning to construct and manage its first retail station from early 2017. Potential future growth of the network will be based on an agreed business plan and strategy.

Both business ventures fit strategically with our objective to secure outlets for Kuwait Export Crude and our refined products. We will supply a steady and secure slate of products to the growing Vietnamese market, and subsequently contribute positively to Vietnam's social and economic development.

To what extent has KPI modified its strategy to cope with the low oil price environment? Is there an increased focus on operational efficiency, for example?

We have seen a slowdown in downstream investment, just as upstream investment has been reduced. Oil prices are low and the

refining margin is not healthy enough to support any investment in downstream activities. Building a new refinery has become very expensive because you need to build a big, integrated, very complex refinery with petrochemicals production capabilities and expensive units to crack fuel oil. With these requirements it will cost in the range of US\$7bn to US\$9bn per project.

However, in Kuwait and other GCC countries, we are proceeding with these projects because the oil business is cyclical. After three to five years in a downward cycle, there will be no projects around while demand has grown. We will face that period with very good projects on hand. The demand will catch up, especially in the Middle East and Asia.

Bakheet S. Al-Rashidi is the President & CEO of Kuwait Petroleum International (KPI). A graduate in chemical engineering from Alexandria University, Al-Rashidi has more than 30 years of experience in the refining industry and is a leader with thorough knowledge of global refining and petrochemicals. He is an active member of premier international bodies and technical committees on oil and gas and has participated as a keynote speaker at various international forums.

Al-Rashidi has also spearheaded several of the Kuwaiti oil sector's local projects and is currently leading KPI's major projects, namely the Nghi Son Refinery and Petrochemicals Project in Vietnam and the proposed expansion of KPI refining capacity in Oman. FOR YOUR MOST CHALLENGING OIL & GAS PROJECTS







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Flagship Fujairah

The storage and bunking sector is on the march in the Gulf, says Martin Clark.

UJAIRAH RETAINS ITS position at the top table when it comes to storage and bunkering activities in the Middle East Gulf and, indeed, worldwide. Together with Singapore, the northern emirate is among the world's prime bunkering ports, holding large supplies of marine fuels and serving as a regional trading and pricing centre for oil products.

As well as being the second most productive region in terms of bunkering capacity, Fujairah is now ranked as the third largest oil storage and products trading centre in the world, behind only Rotterdam and Singapore. Its strategic position, and the strong growth of the region's trade with Asia, means that's unlikely to change anytime soon.

The Port of Fujairah is the only multipurpose port on the eastern seaboard of the UAE, approximately 70 nautical miles from the Straits of Hormuz. It remains a critical link in the chain that connects the oil-rich Gulf with the rest of the world. Fujairah is also linked to Abu Dhabi's vast oilfields directly via the Habshan pipeline.

Regional expansion

If anything, it's a role that is set to expand as operators continue to grow their infrastructure and channel new investment.

Among them, Singapore's Concord Energy has begun work on a second oil terminal, underlining its commitment to the region. The facilities will connect with a newly completed very large crude carrier (VLCC) jetty – the first VLCC jetty on the Indian Ocean – which was opened in September 2016.

Yet another gauge of Fujairah's long-term ambition also became evident this year. The UAE's Fujairah Oil Industry Zone (FOIZ) began publishing weekly inventory storage data in early 2017 for the first time, a further move designed to advance the emirate's progression towards becoming one of the world's leading energy trading hubs. It appointed S&P Global Platts to distribute the data.

Announcing the inaugural weekly inventory data in January, Dr. Rashid bin Hamad Al Sharqi, FOIZ deputy chairman, said it marks a crucial step to nurturing the growth of a robust energy trading ecosystem within the emirate and across the wider Gulf.

"Fujairah's strategic geographic position at the heart of the growing energy corridor east of the Suez Canal to Asia and Africa, as well as its world-class bunkering and oil products storage, heralds the emirate's dawn as a global energy hub," he said.

Oman developments

Fujairah is now ranked as the third largest oil storage and products trading centre in the world."

Other centres offering storage and bunkering services to Gulf maritime traffic include Sohar in northern Oman, and the newly-developed port of Duqm on the Arabian Sea, in centraleastern Oman. These are not deemed rival centres in terms of scale, however – at least not yet.

Indeed, the UAE and Oman plan to build a joint-operated 230,000 bpd refinery in the

Duqm special economic zone, with work potentially commencing by the end of this year.

Nonetheless, there are big plans ahead for Duqm, including the upcoming expansion of the Ras Markaz area's development for warehousing, storage and export of crude oil.

The Gulf is rapidly developing as a global storage and bunkering hub. (Photo: Dave Cosby/flickr)

In October last year, Oman Tank Terminal Company, an offshoot of Oman Oil Company, finalised its initial designs for the oil storage terminal, which will be built in phases. The timing of the first phase is expected to be linked to the launch of the Duqm refinery. An area over 1,600 hectares has been set aside for the project, which will have a potential crude oil storage capacity of 200mn bbl.

Industry challenges

The ability to attract foreign investment, especially in an era of subdued oil prices, reflects the strong case for both the UAE and Oman.

Beyond investment, both face multiple other challenges too, including industry-wide issues such as the lower global sulphur cap on marine fuels in 2020. In just a few years, ships worldwide will have to cut their sulphur emissions to 0.5 per cent from 3.5 per cent now.

Privately, businesses are confident that the industry can adapt, but it nonetheless poses a material and tangible challenge in terms of upgrading facilities. It's a threat or an opportunity: a switch to cleaner fuels in the world's ships could double the profits of the world's most advanced oil refineries, or threaten to put older ones out of business.

Given the Gulf's dynamism in this field, no better highlighted than at Fujairah or in the rapid rise of Duqm port, then it's certainly viewed as a positive.



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Transforming the **oil and gas industry**

An executive plenary session at MEOS 2017 looked at how the oil and gas industry must adapt to survive and thrive in a 'medium for longer' oil price environment.

HE SESSION, ENTITLED 'Transforming the industry' introduced a number of the themes of the show, which took place from 6-9 March in Bahrain. It was addressed by Mohammed Y AI Qahtani, senior vice president, Upstream, Saudi Aramco; Paul Kibsgaard, chairman and CEO, Schlumberger; Krishna Shivram, CEO, Weatherford International; and Lorenzo Simonelli, president and CEO, GE Oil & Gas.

Mohammed Y Al Qahtani highlighted some of the challenges facing the industry, including upstream costs. These more than doubled in the first decade of the century, staying at that level, before declining in the recent downturn, he said. However, costs are picking up again as activity increases.

"That's also influenced by the growing maturity of oilfields, and new discoveries and developments being more challenging," he remarked. "What makes this trend in our industry even more troubling is that, by contrast, the costs of alternatives are on a downward trend. At some point, their paths will cross. Combine rising costs with continuing volatility and cyclicality of the oil market, and pressure will only build on the industry."

There is, Al Qahtani said, an urgent need to radically transform the industry, rapidly and across the board, without compromising on safety and the environment. He outlined five areas that are critical for delivering transformation – innovation, the financial bottom line, cost management, technology and talent. He also highlighted the importance of localisation and Aramco's IKTVA programme which aims to double local content to 70 per cent.

"Our industry's transformation will need to be fuelled by major technology developments," he said. "The fourth industrial revolution is well underway. This new age offers gamechanging technologies for our industry development; nanotechnology, quantum computing, 3D printing, artificial intelligence and big data offer the greatest potential for our industry. We can also learn



The executive plenary session on 'Transforming the Industry'

from other industries such as ICT, aerospace and even medical technologies."

Al Qahtani highlighted some of the key upstream technologies being focused on by Saudi Aramco. "For example, with the latest breakthrough from TeraPOWERS, we are moving from billion cell to trillion cell reservoir stimulation models. When it comes to technology, the only limit is our imagination."

This new age offers gamechanging technologies for our industry development."

Addressing the issue of talent, he called for closer industry links with academia and commented, "We need the very best talent out there to deal with increasingly complex oil issues, and to develop and employ those fourth industrial revolution technologies. Quality not quantity is our goal, something we pay special attention to with our Upstream Professional Development Center which is an industry leader in training, development and knowledge transfer." Throughout the downturn Saudi Aramco did not stopped hiring and continues to do so, he said.

"Our industry is rarely considered innovative by people outside our industry who see us as conservative, and reluctant to change," Al Qahtani concluded. "But I know that innovation defines our destiny, and the success we enjoy today. It's why I'm confident we inside this industry will lead the radical and rapid transformation that is essential to secure our future. We need to be structured, consistent and sustainable in our approach."

Paul Kibsgaard said, "The time has come to move from the focus on cost cutting and headcount reductions to how the industry can reinvent and transform itself by rebuilding both capabilities and capacity as well as establishing new and more collaborative business models."

Noting that the technical performance of the oil industry lags behind other technology driven industries such as automotive and aerospace, he called for a "step change in quality and efficiency of all major business processes as well as broader technology systems to integrate hardware and software platforms."

"We believe that scale, and the associated

MEOS 2017

financial strength and technical expertise, will become an increasingly important performance driver in our industry as it directly affects the ability to invest in technology innovation, business transformation programmes and more reliable risk-based business models. In light of this Schlumberger continues to focus on strengthening the breadth of our technology offering, the extent of our global footprint and how we leverage the data we create and capture from all our operations," he said.

Schlumberger has strengthened the breadth of its technology offering through targeted acquisitions and establishing four separate integration businesses to complement individual product lines. "The breadth of our technology portfolio and technical expertise, together with our strong integration capabilities, enable us to deliver unique value for our customers," he said.

The industry would benefit from more alignment and collaboration between operators and service partners, he remarked. "We are now seeing signs from customers, traditional as well as new entrants, seeking new engagement models to allow additional activity and new field development." The

The industry would benefit from more alignment and collaboration between operators and service partners."

strength of its relationships and its global footprint make Schlumberger a preferred partner for many of these new business opportunities, he commented.

"The third dimension of scale is the opportunity to leverage the growing volume of data produced in our operations to improve performance, using the latest advancements in high performance computing, big data analytics and machine learning," he said. He described how the company has rebuilt its IT capabilities to allow it to better organise its data and utilise the latest data analytics techniques to optimise and automate business processes.

"One example of these applications is how

we are centrally managing the deployment and movement of our hydraulic fracturing units, and utilising the latest advances in prognostic health management in optimising the maintenance of our products. Using sensors coupled with data analytics we are able to predict the onset of major component failures from our remote monitoring centre in Houston well in advance of their actually happening.

"The same prognostical health management approach has also been introduced in the Middle East to support the growth of hydraulic fracturing operations here to enhance the productivity of fracturing fleets and drive down operating costs. As the Middle East region develops further in unconventional plays, such advances in technology and maintenance practices will help improve project economics."

Kibsgaard concluded, "In order to create a sustainable operating platform for industry it is our collective responsibility to establish new ways of working that reduce the cost per barrel and significantly improve industry performance in the areas of quality, efficiency, technology innovation and workflow information."



Creating a **new way forward**

Lorenzo Simonelli, president and CEO, GE Oil & Gas, spoke exclusively to *Oil Review Middle East* at MEOS 2017, where he participated in the executive plenary session on Transforming the Industry.

VER THE COURSE of the last few years we've seen the industry go through a tumultuous time, and the downturn has really led us to rethink how we can work together, how we can improve collaboration between the supply base and customer base, and how we can innovate to improve the cost per barrel. We need to look at how we can systematically transform and disrupt the industry and create a new way forward. We believe there are a couple of ways in which you can do that.

Firstly, by changing how suppliers and customers work together, so they are working in harmony and taking away inefficiencies in the way they interact. That means they're planning together, working through solutions together, working out specifications together, then applying new ways into product innovation, additive technologies, 3D printing, new concepts to reduce costs and material weight, and looking at scale.

The question is, as the industry starts to improve, how do we ensure that we don't go back to the old way of doing things and make these changes sustainable? I do think we live in a different world now than we did previously, which is going to facilitate that sustainability.

Secondly, as we look at productivity going forward, the application of digital – eg. prognostics, data analytics. The oil and gas industry still only uses at most only three to four per cent of the data available, and is also two to three times more inefficient than other industries. So there is a huge opportunity to take out downtime and reduce costs by applying digital analytics.

GE has been at the forefront of the digital revolution – we announced our transition to a

GE has been at the forefront of the digital revolution."



Lorenzo Simonelli, president and CEO, GE Oil & Gas

digital industrial company a number of years ago and we have established a software centre of excellence in San Ramon, launching what is really the first industrial operating system – Predix – in September 2015. It's a key opportunity for us to provide our customers with better outcomes.

There's huge interest in the Middle East in digital solutions and innovation; we're currently discussing unconventional in the region and are looking at ways to use data to reduce downtime and improve performance. Companies throughout the Middle East are looking at this.

An exciting development for GE Oil & Gas is our merger with Baker Hughes in mid-2017, which will create one of the world's largest oilfield services companies by bringing together Baker Hughes' oilfield services, and GE Oil & Gas's digital solutions and technology. It will enable us to connect the full stream from below the mudline all the way to the topside through to the downstream. The new fullstream digital industrial services company will be a unique offering in the marketplace and will give us the opportunity to help our customers on the cost per barrel.

We believe that to be successful in the region you've also got to be local to your customers. We have manufacturing and service facilities in Dammam, and service shops throughout the region. We have a global view of our supply chain and service infrastructure. We also have a strong focus on localisation, with apprenticeship programmes and internships to build the talent for tomorrow. This industry has always been cyclical, so maintaining the right labour force has not been easy. Through productivity enhancements and training we ensure that we've got the necessary skills.

GE sees the oil and gas industry as one that needs to be transformed from a technology perspective, and has the opportunity to do so. The oil and gas resources are available, but in harder to reach places, and this requires technology from an extraction perspective at the right cost. We see the global demand for energy continuing to increase, and the oil and gas industry as key to providing the molecules that will satisfy this increase in energy demand. The regulatory framework and environment also continues to be more of an important element.

GE is well suited to work with our partners and customers to provide solutions, taking into account our CO_2 footprint, the technology required, our digital offering, and the ways we can advance productivity, as we are doing in our power and aviation businesses. The cycle we've seen in other industries is now coming across to the oil and gas industry, and it's very well suited to GE.

So we're excited about the future. We have a commitment to the region and to our customer base – we're here for the long term.

Embracing innovative solutions

IN THE SECOND annual roundtable hosted by Trelleborg, industry experts agreed that the silver lining in the low barrel price is the willingness of the industry to embrace innovative solutions that can lower overall costs while not compromising safety. The roundtable explored issues raised from Trelleborg's 2017 'Next Level Report' that gathered views from individuals involved in the offshore oil and gas industry.

Antony Croston, business group director of Trelleborg's offshore operation in Houston, said, "Adversity creates innovation and brings people together. With less activity in the industry, people have more time to investigate solutions and are more receptive to new innovations, but a key first step is defining the need of the customer. Forward thinking companies are taking the time to spend money upfront to be more efficient in the long term.

"The Internet of Things is a great idea. The limitation we have in the oil and gas industry includes what we do with our data. As an industry we are just getting to grips with what we can obtain and there is lots of data being acquired right now. We need to figure out how we can use the data and how we can make efficient decisions based on it. When we discuss the Internet of Things and machines talking to each other, being an intelligent system, I think that is quite a distance away for offshore oil and gas."

In light of these challenges and opportunities, events like the Offshore Technology Conference (OTC), to be held from 1-4 May in Houston, are central to sharing knowledge. At this year's show, Trelleborg will highlight some of the ways in which the market can improve safety through collaboration and innovation, optimise productivity and retain competitiveness as barrel prices recover.

Trelleborg will officially introduce its new Global Riser Analysis team at OTC, growing its Houston-based engineering group by incorporating inhouse mathematical simulation capabilities to its existing product design and manufacturing capabilities.

Trelleborg will also announce the introduction of three technically advanced multi-purpose perfluoroelastomer (FFKM) compounds for oil & gas applications. Developed to be compatible with virtually all chemical media and over the widest temperature range possible, the newest Isolast® formulations provide real benefits and cost advantages with optimum sealing reliability and extending service life.

Trelleborg will exhibit its range of innovative offshore solutions at OTC Houston 2017 in hall D on stand 1928.



Trelleborg will showcase new solutions at OTC 2017

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Addressing a leading **Cause of corrosion**

Subhash Nair, MEA regional marketing manager for Dow Micobial Control, describes how Dow is helping to prevent microbially influenced corrosion (MIC).

OW COMBINES A comprehensive suite of proven chemistries used during exploration and production, with an industry leading portfolio of sustainable separation and water purification technologies, to help the region address its unique water resource management needs. This includes a portfolio of biocide technologies that help control microbial growth and prevent microbially influenced corrosion (MIC),

reduce well and reservoir souring, and improve production and resource recovery safely and sustainably in a variety of hydrocarbon operations.

The treatment of injection water for reuse in oilfield extraction is essential, especially in a water-scarce region such as the Middle East. Dow supports its customers with effective, optimised microbial control programmes that fight a wide spectrum of bacteria to keep processes running efficiently. The biocides recommended by Dow have all been rigorously tested, registered and approved for use by leading authorities, including the U.S. Environmental Protection Agency and the Harmonised Offshore Chemical Notification Format (HOCNF).

When equipment used in oil and gas operations is affected by corrosion, it can severely impede operations, leading to increased opex and even posing a health



Technology 🗲



Subhash Nair, MEA regional marketing manager, Dow Microbial Control

risk for workers. An effective microbial control programme that treats injection water, decontaminates the well and protects the reservoir, can help prevent one of the major contributors to corrosion, namely microbially influenced corrosion (MIC).

Without an effective microbial control programme, microorganisms topside may have the opportunity to attach to metal surfaces in areas of low flow rates. Once biofilms form, the microorganisms contribute to microbially influenced corrosion (MIC) of the injection system. MIC in the injection system can lead to corrosion failures of pipelines and pumps, with the related problems of equipment downtime, lost production and environmental hazards caused by spills or releases.

In Middle Eastern oilfields, seawater injection introduces unwanted microorganisms into the reservoir. Water flooded oilfields and the associated ecosystems provide suitable environments for sulfate reducing bacteria to thrive. If left uncontrolled, they will produce H2S and cause souring in the reservoir. Dow approaches this issue firstly by analysing the chemistry of the available biocides in a given system, so that the most appropriate treatment can be chosen and applied to maintain adequate microbial control. Not all biocides are able to provide control in all three phases of the operation, are compatible with other oilfield chemistries or meet ecotoxicity and biodegradability requirements. Glutaraldehyde is one of the most versatile biocides available on the



DECONTAMINATE the injection well



Langthy periods of water injection leave wells infested with the worst kinds of microsepaneme – those that survive and thrise in downhole conditions. Inclusion of an effective biocide in injection water will provide initial control downhole which helps sustain water injectivity and facilitate optimum flooding operations.



TREAT topside

Produced water can contain bacteris that need to be treated. Treating the water with biocides in topside tacitities will provide an initial reduction of bacteria, thereby helping to prevent corrosion of the assets, reduce souring, and enhance the performance of biocides added in later stages of the process.

PROTECT the reservoir



Throughout continuous water injection it is critical to control microbial growth in the reservoir environment. Biocides that remain effective under elevated heat, pressure and salinity conditions for longer durations of time are necessary for helping to prevent souring and formation of in situ biofilm over time.

market today to effectively address and control microbes. Unlike many other biocides, it is readily biodegradable as classified under OECD 301.

Apart from being the largest manufacturer of biocides globally, Dow also focuses on development of new formulations that are sustainable and robust under extreme salinity and temperature. In the Middle East, Dow's Dubai-based warehouse facility and fully equipped customer application centre with local technical experts ensures we are able to help our customers and the value chain to address the region's unique microbial control needs in a timely manner.

Ensure you're being supplied genuine glutaraldehyde

AN ISSUE THAT will adversely impact oilfield operations in the long-term is the use of counterfeit biocides, owing to relatively lenient regulatory policies in the region. Since it was introduced more than six decades ago, glutaraldehyde has become well known as one of the most effective and versatile molecules available. Unfortunately, its widespread success has resulted in blends of non-genuine glutaraldehyde which lead to a loss of money by companies on the counterfeit-labelled product, and puts workers and the environment at risk. Blends of formaldehyde, glyoxal and other chemicals can replicate the specific gravity and aldehyde titration results of genuine glutaraldehyde.

Dow is actively helping to increase awareness of the dangerous effects of counterfeit biocides among operators and stakeholders through test kits and advocacy campaigns. For more information, visit www.glutaraldehyde.com.

Academic roots, real-world **applications**

An Oxford University spin-out company is introducing a new method of pressure regulation to the Middle East. Steve Busby, business development director, Oxford Flow, reports.

HILE THE CLOISTERED libraries, punting and Pimms of Oxford may seem like a million miles away from the heat of the Middle East, engineers from the town's worldfamous university are about to introduce a new method of pressure regulation to the region – one that can, in essence, help it to do more, for less.

Oxford Flow, an engineering spin-out formed and backed by Oxford Sciences Innovation (OSI), a new £700mn company created to support ambitious Oxford technology companies and funded by names such as Google and the Wellcome Trust, is set to launch its newly patented form of pressure regulation to the Middle East market this year.

C The Oxford Flow valve was developed in response to a pressing problem."

Swapping a diaphragm for a piston

Like perhaps most engineering innovations, the Oxford Flow valve was developed in response to a pressing problem. Professor Thomas Povey, now the technical director of Oxford Flow, was carrying out research into heat transfer in turbine blades but could not find an existing valve that could stand the pressures he was working with.

Undeterred, he set about creating a specific type of valve that used a piston to regulate pressure rather than a diaphragm. In doing so he eliminated one of the major causes of failure in the conventional regulator, which controls pressure by using a diaphragm that constantly modulates according to the pressures acting upon it. This modulation is enabled



by a limited range of elastomers which, because of the very flexibility which enables them to do their job, are prone to fatigue and failure.

A new method of pressure regulation

In the Oxford Flow model, the diaphragm is replaced by a direct sensing piston actuator. One side of the piston is exposed to downstream pipeline pressure while the other side is balanced against a pressure cavity controlled by a pilot regulator. During operation, the piston moves inward, reducing the size of the cavity when the

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pressure regulator

downstream pipeline pressure exceeds that within the pressure cavity set by the pilot regulator.

The movement of the piston actuator in closing reduces the flow rate to maintain a stable downstream pressure. As demand increases, the downstream pressure falls below that set by the pilot and the reverse operation occurs.

Extensive testing revealed that as well as being a much more efficient, durable way of regulating pressure, the Oxford Flow method of pressure regulation brings with it a host of other benefits, including reduced hunting, lower noise emissions, minimised flow turbulence and reduced minimum pressure head-drop.

Other advantages include just one moving part, which means the Oxford Flow valve is much better placed to handle "dirty" or corrosive substances without trapping them. The streamlined construction means that because there is reduced risk of malfunction, repair and replacement needs to take place much less often, meaning an ultralong service schedule when compared to other devices on the market.

C This device can be used in a variety of oil and gas applications."

The devices are also self-powered, self-regulating and selfcontrolling, meaning significantly lower running costs. This will not only contribute to much more reliable service but will also help lower maintenance costs, both in terms of the sums required for reinvestment and the costs of deploying skilled labour to undertake repair of oil and gas infrastructure – all important in a market in which the bottom line is increasingly under pressure.

In addition, making the shift to this new type of valve will not require the wholesale rebuilding of a business's infrastructure. Oxford Flow's technology can also be easily retrofitted into existing pipelines, and is simple to fit into the current strainers and filters used in the sector. For example, the IM Series wafer-type and IHF Series can both be installed between PN and ANSI flanges. Lastly, the valves are both smaller and lighter, meaning they are much easier to install, and smaller crews are required for installation.

Applications in the Middle East

With such an impressive portfolio of attributes, this device can be used in a variety of oil and gas applications, whether offshore, midstream or downstream. It also has the potential for usage in techniques which are particularly in use in the Middle East, such as waterflooding, or water injection, in which production is stimulated by injecting water into the oilfield, which in turn displaces oil and pushes it towards the wellhead meaning careful pressure management is all important. Another area where the device could be deployed is in the processing of produced water - a by-product of oil production from mature wells which is often cleaned and re-deployed in the Enhanced Oil Recovery (EOR) techniques mentioned above. This practice is particularly prevelant in the Middle East, where a majority of produced water is reinjected via EOR techniques compared with around 12 per cent reinjection in the UKCS. Re-using produced water in this way is perhaps the most efficient way to dispose of it, given the extensive processing required to remove chemicals, oil and gas before it can be disposed of into the sea.

In whatever context the devices are used, it is expected that – with their ability to enable oil and gas companies to improve production without increasing costs or sacrificing reliability in a market place that becomes more challenging every year, and will continue to do so – there will be significant interest from the region.

For more information see http://www.oxford-flow.com/



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AkzoNobel products can protect assets against even the harshest corrosive environments. (Photo: iurii/Shutterstock)

Bringing protective coatings products to Iran

As multinational companies make a beeline for Iran to explore the significant growth opportunities that the country offers, AkzoNobel, a leading global paints and coatings company, is underlining its commitment to invest in the country and expand its presence by participating in the Iran Oil Show 2017.

ITH A HERITAGE of more than 100 years and more than 60 per cent of its products used in buildings, infrastructure and transport, AkzoNobel has a corporate philosophy of developing close partnerships with its key customers and offering solutions that help address their challenges. AkzoNobel will be presenting a selection of its innovative protective

coatings products at the show, which takes place from 6-9 May in Tehran. These include its International® brand of innovative products from its Chartek®, Interchar®, Ceilcote® and Enviroline® ranges, used in industries including oil and gas, mining and power – all high-growth sectors in Iran.

AkzoNobel is already supplying products for various commercial projects in Iran. Andrea Meconcelli, director Performance Coatings, AkzoNobel Middle East, said, "We see a strong opportunity to expand our presence in Iran, especially with the country's investments in infrastructure development. Several projects are taking shape across the country, and our products are ideally suited for these, especially in fire-proofing.

We see a strong opportunity to expand our presence in Iran, especially with the country's investments in infrastructure."

"We also see a strong opportunity to support the Iranian fire brigade, who are taking strong measures to improve the quality of fireproofing. For over 45 years, our Interchar and Chartek products have provided anti-corrosive and aesthetic fire protection for steel structures in sectors including infrastructure, power, oil and gas, chemical, mining and bridges. All over the world we are working with our customers from the design phase to application and through to construction, ensuring specification and code compliance."

He added, "The entry of multinational companies in Iran has also led to an increase in demand for high quality products, which will also have a positive impact on our business. We are committed to investing in the country and to being closer to our customers, providing them with protective coatings products that meet their requirements."

As an example, Chartek 7 is a market-leading passive fire protection solution for use on all areas of an asset, across every region of the world, with over six million square metres protected, and bringing a track record of more than 25 years in protecting offshore assets from the North Sea to the Gulf of Mexico. Chartek 7 holds the distinction of being the most specified epoxy passive fire protection (PFP) product for more than 50 years and serves as an ideal choice for the Iranian offshore oil and gas industry.

AkzoNobel is also bringing its latest innovation – Chartek 2218 – an all-new epoxy passive fire protection product aimed at onshore oil, gas and chemical projects. It helps achieve significant cost savings through its simplified installation and unique rapid cure properties. Even at low temperatures, faster application and improved production rates can be achieved, which contribute to reduced overall costs compared to other epoxy passive fire protection alternatives. Meconcelli added, "At a time where cost savings are paramount in the oil and gas industry, Chartek 2218 addresses many areas where our customers look for savings."

The company will also be showcasing its Interchar cellulosic fire protection range of products, which have been designed to cater for architectural applications, including external exposed and internal structural steelwork for tall buildings, commercial buildings, airports and transportation hubs, bridges, stadiums and sports areas. AkzoNobel has recently supplied Interchar products for several commercial projects in Iran.

AkzoNobel's International® brand also includes product ranges such as Interzone, Intergard, Interline and Interzinc, which ensure customer assets are protected against even the harshest corrosive environments. Interzone products have been recorded as performing even after 30 years in service offshore in C5M (highly corrosive marine) environments.

Trusted by industry experts across the globe, AkzoNobel products continue to be leaders in their field – which will add to the confidence of Iranian customers seeking world-class products for their projects.

Developments in **meter technology**

Craig Marshall, project engineer at NEL, traces the evolution of meter technology, and the options available.

OR HIGH ACCURACY liquid flow measurement, the oil and gas industry's preference has traditionally been for turbine and positive displacement meters. This is because these meters characteristically have very good accuracy or a low uncertainty, and excellent repeatability or stability in measurement under unchanged conditions. Consequently, they are excellent meters for high accuracy applications such as custody transfer and fiscal measurement, either offshore or onshore.

In order to validate the performance of these meters during operation, there were two commonly used techniques. Firstly, the meter could be removed and sent to a calibration facility for testing or calibration. Secondly, a meter proving system could be installed in series with the measurement system in order to calibrate the meter in situ. This latter approach allowed for the removal of some sources of uncertainty such as installation effects, but had additional costs in terms of capital, floor space and weight.

There are several designs of proving systems, with the two main categories being pipe or compact provers and master meter systems. Pipe provers are typically larger in size and have a greater calibrated volume for reference, whereas compact provers are generally smaller and lighter. Compact provers are advantageous in terms of capital costs, floor space and weight over their larger cousins, but the smaller calibrated volume can impact on proving success.

C The success of a proving run depends on a number of factors."

Master meters are where another flow meter (master) is used to verify a flow meter used for constant duty. This gives the added



Metering diagnostics in the laboratory

advantage of verifying the performance of a meter in situ, but also allows the master meter to be sent for a laboratory calibration periodically. The master meter is located in a separate stream to the duty meter and only operated during proving to eliminate common-mode error between the meters.

The success of a proving run depends on a number of factors, with the greater chance of success occurring with larger prove volumes and meters with better repeatability. Owing to their excellent repeatability, turbine and positive displacement meters were often installed, with a proving system being the calibration method of choice. If a meter isn't repeatable, then the physical act of proving a meter in the field can be quite a timeconsuming process.

If there was enough floor space available and the capital expense was appropriate for the value of the fluids being measured, then often a large uni-directional or bi-directional prover would have been installed to prove the turbine or positive displacement meter of choice. If the meter size was small, then a compact prover would have been selected as a smaller calibrated volume would suffice for proving, and cost benefits would have been achieved.

In the downstream oil and gas industry a master meter system was often installed to prove the duty meters. When the master

meter required calibration a mobile proving unit, typically based on a compact prover, was installed to complete a calibration and then was removed. For operators, this negated any additional maintenance requirements as they owned and operated their own prover system.

However, if the available space or weight was insufficient for a prover of any type, the best option was usually to plan a regular calibration of the meter at an accredited facility. This did require two or more stream system, however, to avoid long periods of shutdown.

In the onshore oil and gas industry, prover systems with turbine and positive displacement meters were very common, more so than offshore. This was because there were more available space and structures in place to support and maintain the equipment and typically the product value was higher, being processed or refined products.

Technology revolution

The trend is now to use metering systems which have moved further away from the criteria that would make prover systems the first choice technology. Couple this with the changes in measurement technologies over the past couple of decades, and it is clear that the standard turbine or positive displacement and prover combination is no longer first choice when it comes to high accuracy measurement. Instead, Ultrasonic and Coriolis meters have grown in popularity, primarily due to their increasing performance and the specific attributes of each meter type.

Ultrasonic meters are non-intrusive devices and as such have a negligible additional pressure loss to a standard pipe. They also have a much larger turndown than traditional technologies, making a single meter more applicable over a wider range of flows instead of using a header skid with multiple meters arranged in parallel.

Coriolis meters are mass measurement devices with a turndown greater than traditional techniques but not as large as ultrasonic meters. The achievable uncertainty on Coriolis meters is becoming on par with national flow measurement standards.

Ultrasonic and Coriolis meters also offer advanced diagnostics in measurement that allow the detailed monitoring of all recorded data to be used to identify any problems

As technological capability evolves, end users have an ever growing number of options available to them."



within the metering system and to complete a 'health-check' of the meter in operation. This allows confidence in meter and system performance as well as the potential to extend recalibration intervals. If there is no shift in meter diagnostics over a period of time, this indicates that the meter has not shifted in service and therefore does not need a recalibration. This could potentially save a lot of operating costs for very little capital costs and some data analysis time.

Both technologies offer advantages over their traditional counterparts, but still have some shortcomings. For instance, the repeatability of these meters is inferior to that provided by turbine and positive displacement meters, meaning they are theoretically more difficult to prove; not impossible, it would just take longer (additional runs) or require a larger calibrated prover volume.

What the future holds

As technological capability evolves, so end users have an ever growing number of options available to them. For example, there are more meter technologies available that are able to achieve the low uncertainty required for high accuracy applications. And, there is no one meter that is the best choice for every application, because there are advantages and disadvantages for each, with only the customer criteria changing.

However, the criteria for measurement have changed in favour of more compact, lighter

and cost-effective technologies that still deliver the required uncertainty in measurement, with a definitive move from large, bulky on-site prover systems to the use of laboratories to recalibrate the meters. Technology has also leaped forward in the form of diagnostics to aid the decline in prover system and traditional technologies.

Of course, as technology capabilities continue to evolve, the industry of the future may have different ideas, and the criteria for measurement may change again. For instance, the priority criteria may move away from performance where it is more beneficial to have a constant measurement with a larger uncertainty, than a high accuracy measurement that has a limited lifespan. There may also be a situation where single phase measurements are no longer required as multiphase meters improve in performance.

As long as new technologies and techniques are tried and tested, there will continue to be a measurement system capable of delivering the requirements of an ever-evolving set of customer criteria.

NEL is a provider of technical consultancy, research, testing and programme management services. Part of the TÜV SÜD Group, NEL is also a global centre of excellence for flow measurement and fluid flow systems, and custodian of the UK's National Flow Measurement Standards.

Addressing global oil and gas production chemistry challenges

SCHLUMBERGER HAS LAUNCHED a new purpose-built Production Technologies Centre of Excellence in Houston, USA aimed at solving customers' global challenges related to oil and gas production chemistry, particularly those encountered in deepwater, heavy oil and other extreme environments.

Supporting worldwide operations, the centre features nine laboratories that combine the best of Schlumberger process systems, production software and advanced chemistry. Forty research scientists are dedicated exclusively to product development and formulation activities that maintain asset integrity, address flow assurance challenges and remedy production issues, such as deposit formation and naturally occurring gases.

"This centre brings under one roof, our capabilities in chemical research, production chemicals formulation and performance testing for our global operations," said Guy Arrington, president, M-I SWACO, at Schlumberger. "Using proprietary technologies for product development, testing, sensitivity studies, and modelling operating scenarios, we aim to enhance oil and gas production in any environment, regardless of difficulty."

Integrated production workflows, uniquely available through Schlumberger, combine the testing of reservoir fluids with advanced chemistry to support the development of specifically tailored chemicals and facilitate the testing of formulations under customer-specific conditions.

The diverse development and testing capabilities available in the centre aided a customer in the Middle East that sought to decontaminate electrical submersible pumps with an in-situ solution to prevent unnecessary prolonged shut-in and mitigate costs of pump reconditioning. Schlumberger production



The Schlumberger Production Technologies Centre of Excellence offers diverse product development and testing capabilities to solve global production chemical challenges. (Photo: Schlumberger)

chemicals experts recommended a scale dissolver solution for in-situ removal of NORM sulfate scale, which helped the customer reduce well downtime, well remediation time and costs, while restoring full production.

Schlumberger also has a worldwide network of regionally located laboratories that support production chemicals operations, which enables customers to optimise production chemical treatments from reservoir to refinery.



Challenging times for rigs and drilling

THE RSI GROUP specialises in professional drilling rig surveys and technical project support. RSI provides its inspection services to the majority of the small, medium and major oil companies in business today.

During the ongoing downturn in the oil industry, many offshore and onshore drilling units have been stacked and laid up. If operators are to avoid rig equipment NPT during their future drilling operations, then close scrutiny of the drilling unit equipment, systems and operations on these stacked drilling units would be required. The pressures on the industry stakeholders to ensure that costs are kept to a minimum can certainly have an adverse effect on the condition of stacked drilling units.

The RSI Group chairman and CEO, Craig T Sinclair said, "In these challenging times the RSI Group provides peace of mind for the operators. RSI represents the professional end of the rig inspection market and for 16 years we have



Craig T Sinclair, RSI Group chairman and CEO. (Photo: RSI)

consistently delivered very high standards of drilling rig inspection. In fact, there is no other inspection company in business today that comes close to the quality of service and professional delivery that RSI provides."

The worldwide drilling industry is said to be shrinking by the day, with the departments being trimmed and staff becoming redundant. All of these events could have a negative impact on the condition, maintenance and operations on stacked drilling assets. It is therefore almost imperative for prospective operators to ensure that these stacked drilling assets are thoroughly inspected and tested prior to reactivation and drilling operations commencing.

RSI Group would ensure the safe and efficient working of its drilling operations through its companies – Rig Survey International, RSI Engineering and RSI Well Control Services. The companies work 24/7, dispatching engineers to the ongoing projects to check on the rig equipment, systems and operations.

Speciality footwear manufacturers SLIC to launch brand new line for men

SAUDI ARABIA-OWNED COMPANY SLIC specialises in safety, military and casual footwear, having brought technology from Wolverine Inc. USA when it was established in 1982.

Now, the company is looking to create a new production line to produce "comfortshoe" brand for men and the new line of the casual shoes will be available in the Saudi Arabian market in April 2017 through SLIC shops and online stores.

The factory is located in Dammam Second Industrial City on a total area of 15,000 sq m and is equipped with many production lines, consists of high tech new machines and a lab to ensure that product quality is meeting international standards. It also owns certificates from SATRA & ISO 9001.

Today, SLIC products hold major share in the Saudi Arabian market for both safety and military footwear sector. It also holds a good share in the GCC market. Recently, the company has begun to penetrate some Arabian markets for bigger share.

According to the company, SLIC footwear are comfortable and tough as they are produced under latest technology keeping in mind the quality, flexibility and performance, while meeting both EN and ASTM standards. Composite toe and ladies footwear are also available with guarantee against manufacturing defects for six months.











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Eliminating the high cost of meter calibration verification

FLUID COMPONENTS INTERNATIONAL (FCI) has launched the verical in-situ calibration verification system for the ST100 Flare Gas Flow Meter which allows offshore oil/gas process engineers and operators to eliminate the task of flow meter calibrations. Traditional flow meter calibration is a time-consuming and costly process requiring shutting down the line, pulling the meter, installing a spare and paying a lab fee to help meet air quality management regulations.

FCI's calibration verification system reduces flow meter operating costs in flare gas applications aboard offshore platforms, at land-based oil/gas facilities and in petrochemical plants.

The VeriCal In-Situ Calibration System verifies the ST100 Flow Meter's flare gas calibration is accurate in minutes without removing the meter from the pipe or process to meet MMS regulations. In the past, oil/gas companies had to endure the cost and hassle of periodically pulling their flow meters from the process, then returning them to the manufacturer or a calibration lab for testing and finally paying to ship them back for re-installation.



The VeriCal In-Situ Calibration Verification System is ideal for flare gas monitoring on offshore platforms and other hard to access production sites. (Photo: FCI)

Setting a new industry benchmark in process and plant air/gas flow measurement, the ST100 Series Air/Gas Flow Meter offers the most feature-rich and function-rich electronics available. The ST100 meter's performance delivers unsurpassed adaptability and value to meet plant gas flow measurement applications.

With a unique graphical, multivariable, backlit LCD display/readout, the ST100 meter brings new meaning to the term "process information." It provides the industry's most comprehensive information with continuous display of all process measurements and alarm status, and the ability to interrogate for service diagnostics.

The easy-to-use ST100 meter stores up to five unique calibration groups to accommodate broad flow ranges, differing mixtures of the same gas and multiple gases, and obtains up to 1000:1 turndown. Also standard is an on-board data logger with an easily accessible, removable micro-SD memory card capable of storing 40 million readings. With two multi-variable core model families, oil/gas engineers can choose from the ST and STP families. ST meters measure both mass flow and temperature, and the exclusive STP family adds a third parameter, pressure, making the ST100 the world's first triple-variable thermal flow meter.

Producing and distributing piping materials worldwide

RACCORTUBI GROUP MANUFACTURES, stocks and supplies pipes, tubes, fittings and flanges in stainless steel, duplex, superduplex, 6Mo, nickel alloys and titanium from strategic locations around the world. The company supplies piping packages for critical applications, such as chemical and petrochemical plants, oil refineries, power plants, shipyards, fertiliser plants and offshore platforms.

Raccortubi Group can offer a complete range of butt weld fittings from ½" up to 56", almost without wall thickness limitations, thanks to the extensive manufacturing expertise of the two integrated plants Tecninox and Petrol Raccord. In addition, fittings are produced to international standards or tailor-made from customers' drawings, according to the diameter and wall thickness required, starting from seamless and welded pipes, from sheets/plates or from forgings.

Within Raccortubi Group, pipes from stock are used as raw material in the manufacturing of butt weld fitting, with stocks then constantly replenished by the Group's integrated mills, giving them a consistent supply of fittings from which to fulfil customer orders immediately. The combination of stockholding and manufacturing activities allows for quick, cost-effective, comprehensive solutions for the most demanding fields of application, as well as guaranteed quality of the final product.

Quality checks are implemented throughout the entire production process in order to achieve the highest standards, and fully-certified products in accordance with the most stringent market requirements are available off the shelf. Integrated software guarantees the real-time availability of quality certifications for any placed order, allowing customers to review all the required documentation online, even before the goods are delivered.

Raccortubi Group is able to guarantee rapid fulfilment of customer orders around the world, thanks to its stockholding subsidiaries in Brazil, UAE, Scotland and Singapore, along with its branch office in London. By drawing on local expertise and knowledge, the Group can



satisfy key customers of each relevant region. All the warehouses are stocked according to the specific needs of the local market.

Raccortubi Middle East, the Group's subsidiary based in Dubai (Jebel Ali Free Zone), was established as a local stockist of piping materials in standard and special grades, with the aim of serving clients in the area in a faster, more efficient way. It fulfils complete project package requests as well as ex-stock necessities for maintenance and urgent requirements, being also able to personalise orders according to customer requirements.

Raccortubi can therefore offer its clients added value by combining its expertise as a producer and its flexibility as a stockholder, together with its worldwide presence and the pursuit of the highest quality standards in all phases of the supply chain.

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Qatar has recognised the need for international standard compliance and is updating their labour law to improve the current working environment. The country is bolstering existing legislation resulting in tighter regulations on fire safety, making it crucial to educate industry on developing and implementing well-planned health and safety strategies.

With all the uncertainty in the industry, do you know how this affects you and what changes you need to implement?



Alan Crawford-CMIOSH HSE Specialist Supreme Committee for Delivery and Legacy 2022



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Ali Nadeem

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Halliburton introduces SPECTRUM[™] FUSION coiled tubing service

HALLIBURTON HAS INTRODUCED SPECTRUMSM FUSION service, the newest offering in the SPECTRUM family of real-time coiled tubing services. The FUSION service includes the first real-time system in the market using hybrid cable technology that combines fibre optic and electric to provide downhole communication and continuous power for a variety of diagnostic applications. The cable is conveyed through coiled tubing to deliver intervention, diagnostic and reservoir assessment services in one trip downhole to help customers achieve greater efficiency, safer operations and a higher return on investment.

Since the 2016 launch of SPECTRUM[™] Real-Time Coiled Tubing Services, Halliburton has seen a rapid increase in the demand for diagnostic and intervention services. The SPECTRUM family of services has been the fastest growing segment in the company's coiled tubing business with operations in over ten countries. The family of services is designed to deliver more accurate and effective interventions by capturing data such as weight on bit, pressure, temperature, and acoustics, with casing collar locator and gamma ray for depth correlation in real time.

The SPECTRUM FUSION service is the new enhanced platform for real-time coiled tubing services that eliminates runs and reduces surface footprint by integrating full wireline capability with



downhole intervention tools. The FUSION service combines the existing insight from fibre optics inside the coil with power from the surface creating versatility in selecting logging tools. It also enables customers to diagnose wellbore conditions in real time and customise the wellbore treatment or intervention operation using the data transmitted to the surface.

David Adams, Halliburton senior vice president for the Completion and Production Division said, "Given the increasing complexity of developing mature fields and offshore environments, the SPECTRUM FUSION service's unique combination of coiled tubing intervention and wireline diagnostic capability provides critical downhole data for customising well intervention, reducing risk and maximising services performed in a single run."

For more information on the SPECTRUM FUSION coiled tubing service, visit: http://solutions.halliburton.com/spectrum.

KLAW launches new cryogenic dry disconnect coupling

KLAW HAS LAUNCHED a dry disconnect coupling for the transfer of cryogenic media such as LNG.

The CryoDC is designed as a quick connect and disconnect coupling with no spillage of product. This is a major advance on more traditional methods of connecting cryogenic transfer



The CryoDC from KLAW

lines. such as flange connections and hammer unions/CGA fittings.

The CryoDC comprises a tank and hose unit. Operation is a single action using a straightforward turning motion to connect the couplings which opens the internal valves. This requires no special tools or torque settings. The new cryogenic dry disconnect coupling is therefore much faster, safer and more reliable than traditional methods meaning operators require far less training.

The new CryoDC from KLAW is designed for a variety of applications such as bunkering, tank storage facilities, refuelling applications, air separation units (ASU), railcars, trucks, and ISO tanks.

Precision engineered in stainless steel with PTFE seals, the CryoDC hose and tank couplings are available in 2", 3", 4" and 6" diameters. They are available with ANSI 150 flange or NPT female with other connection types also available. All CryoDC units are designed, manufactured and fully interchangeable with ISO 18683.

This new CryoDC coupling joins a full range of cryogenic transfer products from KLAW including Cryobreak, Cryo Emergency Release Couplings, Cryo Metallic Hoses and Cryo Composite Hoses.

Further information on the KLAW CryoDC disconnect coupling is available from KLAW, email info@klawproducts.com.

KONGSBERG introduces subsea monitoring capabilities to cNODE transponder series

THE CAPABILITIES OF Kongsberg Maritime's cNODE series of transponders for underwater acoustic positioning and data link are expanding with the introduction of cNODE IQAM at Ocean Business. In a first for the established technology-leading transponder range, KONGSBERG is offering the ability to log internal sensors and/or customers' external sensors, transforming cNODE into a compact, selfcontained subsea monitoring system, complete with data processing, positioning and data communication functionality.

cNODE IQAM (Intelligent Data Analysis and Monitoring) is an advanced instrument system developed for a broad range of subsea data acquisition and integrity monitoring applications for seabed structures, including anchor piles, manifolds, PLETS, well heads and pipelines. It can also be used for general environmental, leak detection, seabed deformation or subsidence monitoring.



Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS - QATAR

Project	City	Facility	Budget (\$ US)	Status
Occidental Petroleum Corporation (OXY) -	North Dome	Oil Field	5,000,000,000	EPC ITB
Expansion of Idd el-Shargi North Dome (ISND Phase-5)				
Oryx GTL - Expansion of Gas To Liquids Plant	Ras Laffan	Gas to Liquids (GTL)	1,500,000,000	Feasibility Study
Qatar Petrochemical Company (QAPCO) -	Mesaieed	Ethylene	300,000,000	Construction
Ethylene Plant Expansion - Phase 3				
Qatar Petroleum (QP) -	Mesaieed	Gas Processing	50,000,000	Construction
Air Compressor Replacement at Mesaieed Refinery				
Qatar Petroleum (QP) -	Various	Jet Fuel Pipeline	350,000,000	Engineering & Procurement
Hamad International Airport Jet A1 Fuel Pipeline				
Qatar Petroleum (QP) -	North Field	Offshore Platform	200,000,000	Engineering & Procurement
NFA complex - New NFA Wellhead Platform WHP-3				
Qatar Petroleum (QP) -	Mesaieed	Gas Processing	50,000,000	Engineering & Procurement
Vapour Recovery System at Multi Product Berth				
Qatargas - NFB Offshore Living Quarters Accommodation Project	Qatar	Offshore Platform	150,000,000	EPC ITB
Qatargas - Zekreet Gasoline Production Facility - Phase 2	Ras Laffan	Gas Production	2,000,000,000	FEED
RasGas - Helium 3 Production Plant	Ras Laffan	Helium	600,000,000	Construction
RasGas - Qatar Barzan Gas Field Development Project (Overview)	North Field	Gas Field Development	10,300,000,000	Construction
RasGas - Qatar Barzan Gas Field Development Project -	North Field	Gas Field Development	700,000,000	Engineering & Procurement
Offshore - Phase 2				
RasGas - Qatar Barzan Gas Field Development Project -	North Field	Gas Field Development	300,000,000	Engineering & Procurement
Offshore - Phase 3				
Shell - Pearl GTL Scheme - Onshore & Offshore Facilities	Qatar	Natural Gas Liquefaction (NGL)	2,000,000,000	Construction



Project Databank

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Project Focus

Compiled by Data Media Systems

Project Summary

Project Name	Qatar Petroleum - Al Shaheen Offshore Field Development
Name of Client	Qatar Petroleum
Estimated Budget (US\$)	500,000,000
Facility Type	Oil & Gas Field
Status	Construction
Project Start	Q1-2014
End Date	Q3-2017
FEED	WorleyParsons
РМС	ExxonMobilCorporation, Total, Shell, CONOCO Phillips, Maersk Oil
Main Contractor	Total
Contract Value (\$ US)	300,000,000
Award Date	Q3-2015

Background

Al Shaheen field is one of the world's largest oilfields and is located in block 5 offshore northern Qatar. The field is operated under a production sharing agreement on behalf of Qatar Petroleum. Current production from the field is around 40 per cent of Qatar's crude oil, at around 300,000 bpd. Maersk Oil has been operating the Al Shaheen field for 25 years while being in a production sharing agreement with Qatar Petroleum, which will be expiring in July 2017. Total will then be taking over the Al Shaheen field operations following its award of the concession, and will possess a 30 per cent stake in the project, with Qatar Petroleum retaining 70 per cent. Total plans to invest US\$2bn over five years to maintain the field's output and increase production further. In June 2016 QP and Total established a new company, North Oil Company (NOC) to jointly develop and operate the Al Shaheen field, which will be 70 percent owned by QP and 30 percent by Total. As part of the joint venture, QP has licensed the rights for the production, sale and export of the Al-Shaheen offshore oilfield's crude for 25 years starting July 2017.

The existing development consists of 30 platforms and 300 wells.

Project Schedules						
Feasibility Study	1Q-2014					
FEED	2Q-2014					
EPC ITB	2Q-2015					
Engineering & Procurement	3Q-2015					
Construction	4Q-2015					
Completed	3Q-2017					

Project Scope

Scope of work comprises:

- Drilling of some 40 new production wells
- 20 new water injection wells
- Conversion of 14 existing wells to water injection
- Construction and installation of new production platforms, interconnected with pipelines
- Facilities for gas compression
- A gas export pipeline to Qatar Petroleum's North Field Alpha platform, offshore Qatar
- A number of appraisal wells will be drilled to evaluate possible further production potential.



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Middle East & North Africa

The Baker Hughes Rig Count tracks industry-wide rigs engaged in drilling and related operations, which include drilling, logging, cementing, coring, well testing, waiting on weather, running casing and blowout preventer (BOP) testing.

		THIS MON	TH	VARIANCE	L	AST MONT	Ή		LASTYEAF	{
Country	Land	OffShore	Total	From Last Month	Land	OffShore	Total	Land	OffShore	Total
Middle East										
ABU DHABI	33	14	47	-1	33	15	48	25	11	36
DUBAI	0	2	2	0	0	2	2	0	2	2
IRAQ	40	0	40	-1	41	0	41	61	0	61
JORDAN	0	0	0	0	0	0	0	0	0	0
KUWAIT	59	0	59	7	52	0	52	45	0	45
OMAN	56	1	57	0	57	0	57	57	0	57
PAKISTAN	21	0	21	0	21	0	21	19	0	19
QATAR	5	6	11	1	5	5	10	2	7	9
SAUDI ARABIA	103	17	120	-4	105	19	124	97	18	115
SUDAN	0	0	0	0	0	0	0	0	0	0
SYRIA	0	0	0	0	0	0	0	0	0	0
YEMEN	0	0	0	0	0	0	0	3	0	3
TOTAL	317	40	357	2	314	41	355	309	38	347

North Africa

ALGERIA	50	0	50	-1	51	0	51	49	0	49
EGYPT	18	5	23	-2	19	6	25	46	16	52
LIBYA	0	1	1	0	0	1	1	4	3	7
TUNISIA	1	0	1	-1	1	1	2	0	3	3
TOTAL	69	6	75	-4	35	8	79	102	9	111

Source: Baker Hughes

تحليـــلات النشرة النفصية - الشرق الأوسط www.oilreview.me

> البحرين. وقد بلغت ذروة الإنتاج في حقل عوالي، الذي يعد أكبر الحقول المنتجة في المملكة، ٧٩ ألف برميل يوميا في العام ١٩٧٠، ثم تراجعت لتصل إلى حوالي ٣٢ ألف برميل يوميا بحلول ٢٠٠٩. وعلى الرغم من ذلك خطت بابكو خطوات حثيثة خلال السنوات الأخيرة لزيادة احتياطيات النفط والغاز.

> قال الأنصارى: «يعد مشروع غاز الخف الأولى ضمن المشروعات الكبرى الأخرى. وقد تم إجراء الكثير من الأعمال في هذا المشروع منذ فترة ماضية، وتولت مؤخرا شركة أوكسيدنتال بتروليوم (أوكسي) حفر بئر عميقة بموجب اتفاقية مشتركة للاستكشاف والإنتاج تستهدف الكشف عن احتياطى الخُف الأولى. تلوح فى الأفق إمكانات كبيرة لوجود الغاز في هذا القسم، ومن ثم نشرع في بذل المزيد من الجهود لتقييم الآفاق المحتملة لهذه البئر العميقة. ومما يثير الاهتمام، بصدد هذا المشروع، وجود مناطق مختلفة في هذا القسم، بعضها جاهز للتطوير، والبعض الآخر يحظى بإمكانات كبرة تتطلب إجراء أعمال التقييم، حيث نكون على ثقة من وجود الغاز. غير أننا بحاجة لتقييم هذا المصدر. فضلا عن ذلك، هناك قسمٌ ضخمٌ لا يزال بانتظار الاستكشاف. ونعكف حاليا على تقييم خيارات إقامة هذا المشروع، سواء موجب الاتفاقيات المشتركة للاستكشاف والإنتاج المبرمة مع شركات النفط العالمية، أو اتفاقيات الخدمة المبرمة مع شركات الخدمة، أو من جانبنا نحن».

> وأوضح الأنصاري أن استراتيجية الاستكشاف التي تتبعها بابكو قائمة على منهج ذي شقين. «نحن نوازن بين المخاطر التقنية المرتبطة بالمشروع والعائد من ورائه. ولأن المشروع مليء بالتحديات، نتطلع إلى دعوة طرف آخر ليشاركنا هذه المخاطر، وذلك على غرار الاتفاقيات المشتركة للاستكشاف والإنتاج التي عقدناها مؤخرا مع شركة أوكسيدنتال، وشركات مثل بتروناس وشيفون فيما مضى. فشركات النفط العالمية تقاسمنا التكلفة والمخاطر على حد سواء.

> هذا هو أحد شقي الاستراتيجية. أما الشق الآخر فهو التعهد بإقامة مشروعات خاصة، إذا تسنى لشركة بابكو، بوصفها شركة النفط الوطنية، تحمل المخاطرة. وبين هذا وذاك، نسعى إلى إضافة القيمة على جميع



خريطة من بابكو تبين منطقة المسح بنظام Falcon Plus

المجالات المرتقبة، مما يساعدنا في تحقيق شقي الاستراتيجية، إما لتعزيز الشراكة مع شركات النفط العالمية أو لتطوير المشروعات الخاصة. هذا هو منهجنا بوجه عام في الاستكشاف. هناك أنواعٌ أخرى عديدة من مشاركة المخاطر أو مشاركة الاستثمارات، مثل اتفاقيات مشاركة التطوير والإنتاج، والتي اعتمدناها مؤخرا مع شركة أوكسيدنتال. ونحن ـ بموجب هذه الاتفاقيات ـ لا نتقاسم المخاطر، لأن الحقل معلوم بالفعل، وإنما نتطلع لنقل التكنولوجيا وتبادل الخبرات، إلى جانب مشاركة الاستثمارات. الهدف واحدٌ بالنسبة لجميع هذه التوجهات، وهو زيادة احتياطيات البحرين من مركبات الهيدروكربون، سواء النفط أو الغاز، وتعزيز وتطوير ما نمتلكه على صعيد الإنتاج».

تدعو شركة بابكو أيضا إلى المشاركة الدولية عبر اتفاقية دراسة مشتركة «مبتكرة» تركز على أربع مناطق بحرية تشمل جميع مساحات الحقول البحرية التابعة للدولة، إلى جانب اتفاقية تقييم تقني تركز على قسم الخُف الأولي في الحقول البرية في الحوض الرسوبي منطقة الخليج العربي «ويدمان نورث». وتشمل هذه المناطق تلك المنطقة التي تعد مثابة «الموضع الأمثل غير التقليدي» بالمناطق البحرية في البحرين.

بعد إنجاز الدراسة بنجاح، ستتم دعوة المشاركين

للتفاوض حول اتفاقيات استكشاف واحدة أو أكثر من المناطق البحرية التي تشملها الاتفاقية في البحرين، وهي المناطق التي خضعت لعدد قليل من الاستكشافات وتضم فقط ١٩ بئراً بحرية تم حفرها منذ العام ١٩٦٠ حتى يومنا هذا.

دعم المشروعات

تتبنى شركة بابكو نهجاً إبداعياً آخر في إطار مبادراتها الرامية لدعم مشروعات استكشاف النفط والغاز. وهي تركز من خلالها على الحصول على البيانات أو إعادة معالجة البيانات وإعادة تقييمها.

«لقد انتهينا للتو من جانب الحصول على البيانات المتعلق بمسح المغناطيسية والجاذبية المحمولة جوا، بالاستعانة بنظام Falcon plus المبتكر والذي يُستخدم للمرة الأولى على مستوى الصناعة. قامت الطائرة بتغطية حوالي ٩٥ في المائة من المناطق البرية والبحرية وتفسير البيانات التي حصلنا عليها وقد بلغنا في ذلك مرحلة متقدمة، ومن المقرر أن نتلقى النتائج النهائية والتفسيرات في القريب العاجل. ولا يسعني تسليط الضوء بالقدر الكافي على القيمة التي تضيفها مثل البرية والبحرية. علما بأن جميع الأطراف المشاركة في المروعات الكبرى، إلى جانب المشاركين في اتفاقيات الدراسات المشتركة ، سينالون فوائد جمة من نتائج عمليات المسح الجوية».

وقال الأنصاري أيضا: «إن شركة بابكو بصدد إقامة مشروع ضخم لإعادة معالجة المسوح الزلزالية بالتعاون مع شركة «لارجيو»، لتعزيز جودة البيانات والتصوير، لاسيما في المناطق الأكثر عمقا، وسوف يسهم ذلك ـ بدرجة كبيرة ـ في فهم فرص النجاح بالمنطقة. نحن نعتمد في شركة بابكو أسلوب الانفتاح على نحن نعتمد في شركة بابكو أسلوب الانفتاح على أحدث ما تم التوصل إليه في مجال الحصول على المعلومات عبر المسح الجوي، وإعادة المعالجة الزلزالية والمسوح الزلزالية، وأفضل وأحدث تقنيات التحليل الجيوكيميائي والجيوميكانيكي».

وأضاف بأن كفاءة التكلفة تلعب دوراً أساسياً في عالم اليوم، ويسهم الإبداع والتقنيات في تحقيقها.





يحين الأنصاري عدير الاستكشافات في بايكو

أمةً صغيرةً وطموحٌ كبيرً

رِما تكونُ صناعة النفط والغاز ق البحرين محدودة، مفارنةً بالعديد من الدول المجاورة لها. غير أنها تجحت . بدرجة كبيرة . في تعويض ما ينقصها من موارد من خلال توجه شركة النفط الوطنية البحرينية (بابكو) الذي يتسم بالجرأة والإبداع. فقد وضعت بابكو بالفعل خططاً لاستكشاف الرواسب النفطية غير التقليدية ق الحقول البحرية، وهو ما عكن أن بكسبها الريادة على مستوى المنطقة في هذا المجال. وقد تحدث يحيى الأنصاري، مدير الاستكشافات في شركة نفط البحرين (بابكو) إلى «النشرة التفطية، عن خطط الشركة ومبادراتها في هذا المجال.

تستهدف اكتشاف النفط غير انتقليدى في الحقول والتحليلات باستخدام البيانات التي تم الحصول عليها. البحرية. وإني أشعر بالفخر لكون أن بابكو والهيئة واليوم لدينا منصات بالفعل في للوقع. وهذا للشروغ ومن بين للشروعات الأخرى التي يجري العمل الوطنية للنفط والغاز، تمتلكان الشجاعة لاتخاذ تلك الخطوة. وإننا واثقون من تحقيق النجاح على صعيد الاستكشاف، وقد فعلنا كل ما بوسعنا لوضع مشروعٌ جديدٌ ومثررُ للاهتمام بالنسبة لنا، ولذلك نحن

قال الأنصاري: «تصبح يابكو المُركة الأولى التي المُشروع حير التشغيل، حيث أجرينا جميع الدراسات الحقول البحرية، ولذلك فإننا تواجه تحدياً كبر [إنه

انتطلع لبد، تشغيل هذا المشروع في أقرب وقت ممكن لجنى غاره».

يشمل الحفر والتصديع الهيدروليكي، وهو غير شائع في بها، حملة حقر الأبار البرية لإجراء الاستكشافات التي تستهدف جوانب حقل عوالي (البحرين) الناضج، . والتوسع لأبعد مجال ممكن في الجُزر المعيطة بجزيرة

تحت رعاية صاحب السمو الشيخ خليفة بن زايد آل نهيان رئيس دولة الإمارات العربية المتحدة Under the patronage of H.H. Sheikh Khalifa Bin Zayed Al Nahyan, the President of the United Arab Emirates





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بتروفاك تفوز بعقد الكويت

حصلت شركة بتروفاك، من شركة نقط الكويت، على عقد لتشيد مشروع مركز التجميع رقم ٣٢ في حقل برقان النفطي جنوب شرق الكويت، وتبلغ قيمة هذا المشروع، الذي يتضمن توفير الخدمات الهندسية والتوريد والتشييد، ما يقرب من ١,٣ ملبار دولارأمريكي، كما أن هذا المشروع بعتير أول مركز تجميع للنفط الحامض يتم تطويره في الحقل، وسوف يتولى معالجة النفط الخام والغاز المصاحب المنتجين من حقول عربةجال ومارات وللناقيش وبرقان وارة التي ترتفع بها نسبة كيريتيد الهدروجين.

ومن المقرر أن يبدأ العمل خلال فترة وجيزة،

على أن يتم الانتهاء منه في منتصف ٢٠٢٠. ويشمل نخلق الممل، في مركز التجميع رقم ٣٣ تنفيذ أنشطة جديدة وربطها بالبنية الأساسية للمنشآت القاقة. ومن للتوقع أن تبلغ الطاقة الإنتاجية للمشروع ٢٢٠ ألف برميل نقط يوميا. هذا بالإضافة إلى الماء والفلا وبالج التكثيف المصاحبين. وقال الرئيس التنفيذي للعمليات في المجموعة، مروان شديد: «إن الكويت من الأسواق الأساسية للنجموعة بالشرق الأوسط، وتُنفذ ستروعات بها منذ أواتل المانينيات القرن الماضي. ونحن فخورون العمل معها عن كتب لتسليم المشروع.

> تقرير يكشف عن فجوة في توقعات التوظيف في مجال الطاقة

كشف تقريرٌ صادرٌ عن مؤشر للواهب العظية في مجال. الطاقة (جبني)، والذي أجرى سسحاً لأكثر عن ١٦ ألف منخصص في مجال الطاقة على سنتوى العالم في قطاعات النقط والفاز والطاقة للتحددة والقدرة والطاقة النووية واليتروكيماويات، عن وجود طارق كبير في التوقعات بين مديري التوظيف والمرشحين لتولى الوظائف.

وكان التقرير، الذي أعدته كلّ من شركة «إيرسويفت» التوفير حلول التوظيف العلية للطاعات الطاقة وللملجة والبنية التحتية وEnergy Jobline، موقع التوظيف العالمي البارز لصناعات الطاقة والضناعات الهندسية. قد أغار إلى التوظيف، إذ توقع ٤٩ في لبانة من المتحصصين في منطقة الشرق الأوسط زيادة في الأمور خلال الأشهر الثبائية عشر والموظيف، إذ توقع ٢٨ في لبانة من المتحصصين في منطقة والتوظيف، إذ توقع ٢٨ في لبانة من المتحصصين في منطقة والتوظيف، إذ توقع ٢٨ في لبانة من المتحصصين في منطقة والتوظيف، إذ توقع ٢٨ في لبانة من المتحصصين في منطقة والتوظيف، إذ توقع ٢٨ في لبانة من التعليدي التوظيف والتوظيف الموالية أن يتخذ مديري التوظيف والوظلون مواقف متسلة حتى يستمر قطاع الطاقة في والاحتفاظ بها. غير أنه بوجد في الوقت الراهن نوعٌ من عدم التوافق، لا يتعقد رُبم مديري التوظيف في هذا القطاع أن

اسم الشركة هو العامل الأكثر جذبا للباحثين عن الوطائف، يبنيا تُولي قوى العمل أهسية أكبر للراتب والموقع والنطوير المهني» وفيما بلي النتائج الرئيسية في قطاع النقط والغاز: • يعتقد ثلاثة أرباع سديري التوظيف أن قطاع النقط والغاز ينتقر إلى للواهب وقد ذكر للستطلعة آراؤهم في الشرق الأوسط، أن نقص للهارات يرجع - يشكل رئيسي -إلى ندرة القوى العاملة يسبب الشيخوخة، وفرض سياسات صاربة على الهجرة.

 بُحجم الخريجون عن قطاع النفط والغاز بسبب لصوراتهم حول شيخوخة القوى العامقة ومخاوفهم المتعلقة بالبيئة مقارنة بالقطاعات الحديثة والنظيفة القائمة على التكنولوجيا.

يتوفع نصف للتخصصيٰ في مجال النفط والغاز . تقريبا
 أن يسترد القطاع عافيته خلال الأشهر الـ ١٢ التالية. بينما
 بتوقع ما يقرب من كلئي مديري التوظيف أن يستغرق
 ذلك أكثر من عام.

 ذكر المتخصفون في مجال النفط والغاز آمريكا الشمالية والشرق الأوسط وأوروبا بوصفها مناطقهم المقضلة للعمل.
 أكار ميزة يُقدرها المتحسمون في الشرق الأوسط هي برنادج إلر عابة المنحية.

لقول هانا بيت، العضو المنتدب بُوقع Energy Jobline - «يتعين على مديري التوظيف التفكير بطريقة ذكية حول كيفية جذب لقواعب الجديدة. فقد ولت حروب المزايدات باحطة التكلفة، وهو ما جنح المرشحين رواتب متزايدة». التقرير متاح على الموقع:

http://www.getleeport.com/dowsload-report.

مفكرة رحال الأعمال ¥+1Y أبر فل/تبسان 27-26 معرض وسؤاسر الشرق الأوسط وأفريقيسا لتخسزين المسواتل . StocExpo 2017 مايو/أيار 5 ـ 8 _ مؤتمر تكتولوجيا حقول النقط _ عوستون المجرية ٥ - 9 - المعرض الدولى للنفط والغاز والتكرير والبتروكيماويات ممران 7_8__ مؤغر بترول العراق 2017_لندن 9 - 10 - بؤلمب وبعرض البحار 45_ الغربية ...









أ**خبــــار** النشرة النفصية - الشرق الأوسط www.oilreview.me

بريتـش بتـروليـوم تعلـن عن ثالث اكتشـافاتهـا شـرق دلتا النيـل

أعلنت شركة بريتش بتروليوم عن كشف جديد للغاز في منطقة امتياز شمال دمياط البحرية شرق الدلتا، علما بأن هذا الاكتشاف يعتبر الثالث في هذه المنطقة. وأوضحت الشركة أنها قامت بحفر البئر الاستكشافية «القطامية الضحلة ١» بعمق إجمالي بلغ ١٩٦١ متراً، في مياه عمقها التقريبي ١٠٨ أمتار باستخدام الحفار «القاهر ٢». وقد أكدت تسجيلات الحفر الكهربائية، وبيانات الضغط، وعينات السوائل، وجود طبقة حاملة للغاز سُمكها ٣٧ متراً في صخور رملية عالية الجودة في تكوين البليوسين.

من جانبه قال بوب دادلي، الرئيس التنفيذي لمجموعة بريتش بتروليوم: «بئر القطامية هي ثالث اكتشاف لنا في هذه المنطقة. فإننا نعكف بالفعل على تطوير حقل «أتول» وتقييم حقل سلامات الذي تم اكتشافه سابقا. ويؤكد آخر كشف لنا عن ثقتنا في دلتا النيل بوصفها حوضاً غازياً عالمياً». وفي معرض تعليقه على هذا الاكتشاف، قال هشام مكامه، المئس الاقلم و اش كم وستش يتمامه شوال

مكاوي، الرئيس الإقليمي لشركة بريتش بتروليوم شمال أفريقيا: «نحن سعداء لمواصلة نجاحنا في هذه المناطق



الاكتشاف هو الثالث لبريتش بتروليوم في شرق دلتا النيل

المستهدفة الضحلة لتكوين البليوسين. ونؤمن أن تطوير حقل القطامية من شأنه المساعدة في الكشف عن الموارد التي تضمها الآبار الأخرى القريبة المكتشفة ذات الخصائص المماثلة من حيث الضحالة والضغط المنخفض. ولاشك أن هذا يعتبر جزءاً من التزامنا طويل الأمد تجاه مصر، وإطلاق

إمكاناتها في هذا المجال». وبر القطامية الضحلة تقع على بُعد ٦٠ كيلومتراً شمال مدينة دمياط، وتبعد ٣٠ كيلومتراً جنوب غرب حقل سلامات، و٣٥ كيلومتراً فقط غرب منشآت حقل حابي البحري. وتبلغ حصة بريتش بتروليوم ١٠٠ في المائة من هذا الاكتشاف.

صناعة البتروكيماويات في الخليج تتجاوز مُعدل النمو العالمي

حققت صناعة البتروكيماويات في منطقة الخليج نمواً بنسبة ٣,٧ في المائة خلال العام ٢٠١٦. ويعزى ذلك ـ بدرجة كبيرة ـ إلى إضافة طاقة إنتاجية جديدة في المملكة العربية السعودية، طبقا لدراسة سنوية أعدها الاتحاد الخليجي للبتروكيماويات والكيماويات (جيبكا).

وقد أثبتت الأرقام الواردة في «أبرز أحداث الصناعة في الخليج العربي في العام»، وهو جزء من التقرير السنوي الصادر عن «جيبكا»، أن المنطقة تخطت معدل النمو العالمي المتوسط الذي يبلغ ٢,٢ في المائة. فقد وصلت الطاقة الإنتاجية للمنطقة إلى ١٥٠ مليون طن، يبلغ نصيب السعودية منها ٦٦ في المائة.

وفيما يبرز التقرير انخفاض معدل نمو صناعة البتروكيماويات في الخليج عن نسبة خمسة في المائة في العام ٢٠١٥، والذي يرجع ـ على نحو جزئي ـ إلى القيود المفروضة على توريد المواد الأولية، وعدم استقرار الاقتصاد العالمي، فإن إقامة مشروعات الصناعات نظرة إيجابية متوسطة الأجل للنمو، مثل مُجمع صدارة نظرة إيجابية متوسطة الأجل للنمو، مثل مُجمع صدارة وداو، ومصنع المطاط الصناعي لشركة الجبيل السعودية للبتروكيماويات «كيميا»، الذي عشل شراكة صناعية مناصفة بن سابك وإكسون موبيل للكيماويات.



تم الإعلان في ٢٠١٦ عن مشروعات بتروكيماوية في الخليج بقيمة ١٣ مليار دولار

وقال الدكتور عبد الوهاب السعدون، أمين عام الاتحاد الخليجي للبتروكيماويات والكيماويات: «تواصل الصناعة الإقليمية النمو بشكل صحي عبر دمج التقنيات الجديدة، وإقامة علاقة استراتيجية أفضل، واتباع الطرق الذكية في خضم الاقتصاد العالمي غير المستقر. كذلك تواصل المنطقة ضخ الاستثمارات الهائلة في منشآت جديدة، إلى جانب مكاسب الاستثمار في المنشآت القائمة، حيث يعمل منتجو دول مجلس التعاون الخليجي على استكشاف مصادر جديدة وغير تقليدية للمواد الأولية لتعزيز منتجات الكيماويات. وبعيدا عن تطوير الاستثمار والابتكار في هذا المجال، أسهم الإعلان عن المشروعات الكبرى، التي يناهز رأس مالها عدة مليارات من الدولارات، والتقنيات الجديدة وزيادة الطاقة الإنتاجية، في تحقيق طفرة في توفير فرص العمل».

يجدر بالذكر أنه في العام ٢٠١٦، تم الإعلان عن مشروعات برأس مال يبلغ ١٣ مليار دولار أمريكي في المنطقة، من المقرر تنفيذها بين عامي ٢٠٢٠ و٢٠٢٤ ومن شأنها إضافة ثمانية ملايين طن للطاقة الإنتاجية. ومن المتوقع أن توفر هذه المشروعات ٤ آلاف فرصة عمل جديدة، حسبما ذكر التقرير.





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