

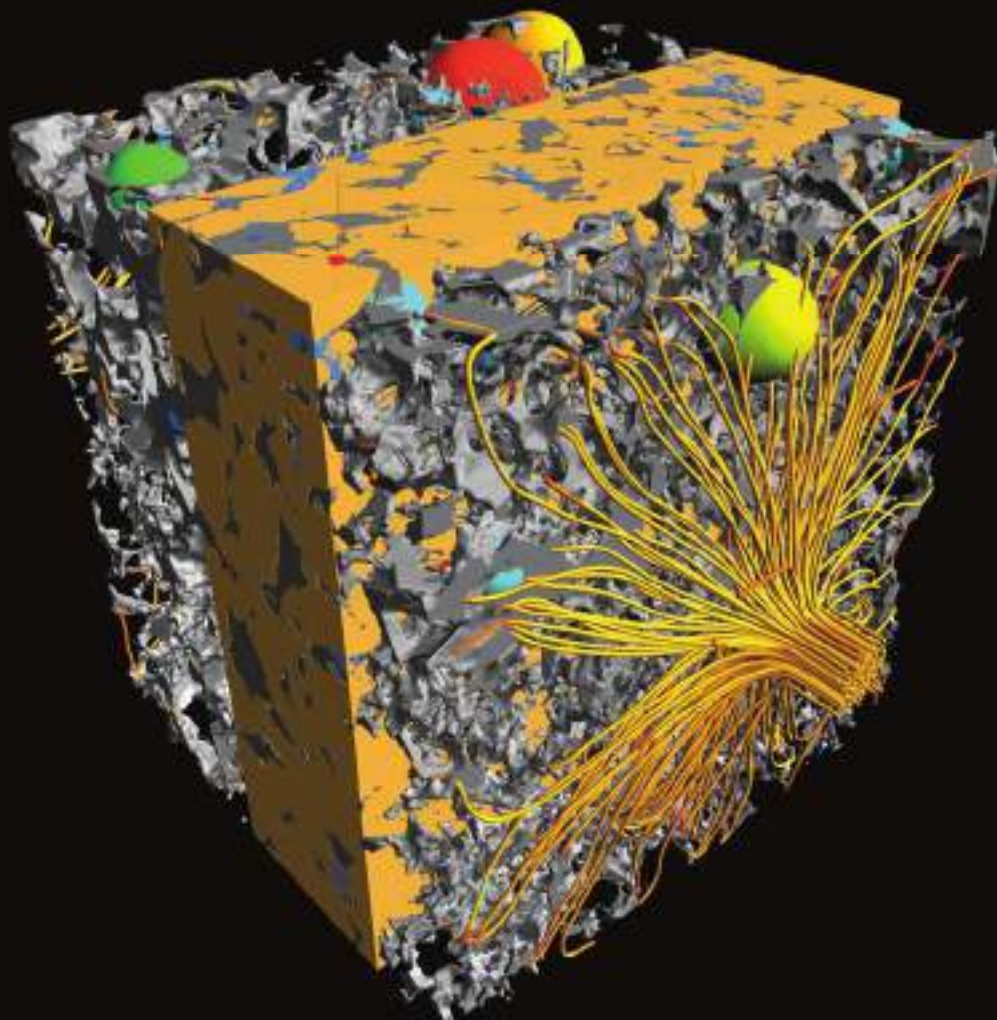
# Oil Review

## Middle East

Covering Oil, Gas and Hydrocarbon Processing

VOLUME 19 | ISSUE 2 2016

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- Bahrain projects move ahead
- The need to maintain focus on training and development
- Keeping compressor emissions under control
- Advances in sour field management technology
- The benefits of ever-growing seismic data volumes
- The increasing demand for automation solutions



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**Chairman:** Derek Fordham

**Printed by:** Emirates Printing Press, Dubai

**Printed in:** February 2016

© Oil Review Middle East ISSN: 1464-9314



## → Editor's note

AS OIL REVIEW goes to press, various meetings between heads of state and oil ministers are underway in a bid to stabilise the oil market and drive a rebound in oil prices. We await the outcome with interest; however, the prospect of increased post-sanctions production from Iran, and the cooling of demand from China, are amongst the factors that may conspire to keep oil prices low, at least for the foreseeable future.

In tough times such as these, training and development budgets are often the first to be cut, as Petrofac CEO Ayman Asfari points out. He argues that with swingeing jobs cuts and the retirement of mature and experienced workers, the industry is losing valuable skills at a time when project complexity is increasing. Our feature on p34 highlights the need to maintain a focus on training and development with the growing focus on localisation in the region, and for the future resilience of the industry.

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Front cover image courtesy of FEI

Arabic front cover image: bluecrayola / Shutterstock

## → Executives' Calendar 2016

**MARCH**

7-10	<b>GEO 2016</b>	MANAMA	www.geo2016.com
8-10	<b>Saudi Downstream</b>	JUBAIL	www.saudidownstream.com
20-24	<b>SOGAT</b>	ABU DHABI	www.sogat.org
21-23	<b>Oil &amp; Gas West Asia (OGWA)</b>	MUSCAT	www.ogwaexpo.com
22-25	<b>OTC Asia</b>	KUALA LUMPUR	www.otcasia.org

**APRIL**

10-11	<b>Kuwait Oil &amp; Gas</b>	KUWAIT	www.cwckuwait.com
12-13	<b>Tank World Expo</b>	DUBAI	www.easyfairs.com
12-14	<b>International SAP Conference for Oil and Gas</b>	THE HAGUE	www.uk.tacook.com
13-17	<b>Iran Plastics</b>	TEHRAN	www.iranplast.ir
18-20	<b>GCC Environment &amp; Sustainability Forum</b>	JEDDAH	www.gccenvironmentforum.com
19-21	<b>8th Mediterranean Offshore Conference (MOC)</b>	ALEXANDRIA	www.moc-egypt.com
20-23	<b>Erbil Oil &amp; Gas</b>	ERBIL	www.erbiloilgas.com
25-26	<b>Big Data Analytics for Oil &amp; Gas</b>	ABU DHABI	www.oilandgasbigdata.com

**MAY**

2-5	<b>Offshore Technology Conference (OTC)</b>	HOUSTON	www.otcnet.org
5-8	<b>Iran International Oil, Gas, Refining &amp; Petrochemicals</b>	TEHRAN	www.iran-oilshow.ir
8-10	<b>Abu Dhabi International Downstream</b>	ABU DHABI	www.adid.wraconferences.com
16-18	<b>Saudi Safety &amp; Security</b>	DAMMAM	www.sss-arabia.com

**JUNE**

1-4	<b>Caspian Oil &amp; Gas</b>	BAKU	www.caspianoilgas.az/2016
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Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.

## Oil & Gas West Asia (OGWA) set to highlight latest developments and opportunities

THE OIL & Gas West Asia (OGWA) Exhibition & Conference, Oman's longstanding biennial oil and gas event and one of the foremost industry events in the Middle East, will take place from March 21 to 23 at the Oman International Exhibition Center, Muscat, Oman.

The event will bring together local, GCC and international oil companies, service providers, equipment suppliers and other companies serving the industry. It will provide a platform to discuss the latest developments and directions of the industry as well as a forum to pursue trade and business opportunities. OGWA will feature the largest Italy, China and Iran pavilions of any oil and gas exhibition in Oman, and around 300 companies from 24 countries. Also occupying the 14,500-sq m exhibition space will be the SME and ICV pavilions, in support of the Oman government's initiatives to promote entrepreneurship and local talent.

As in previous editions, the concurrent and timely EOR Conference will be organised by the Society of Petroleum Engineers (SPE), the largest individual-member organisation worldwide in the upstream segment of the oil and gas industry.

Themed "The EOR Paradigm Shift," the conference will highlight the advances in chemical EOR, thermal EOR, miscible gas injection EOR, low salinity water flooding, emerging and innovative methods, monitoring and



surveillance for EOR, EOR screening studies, well design, drilling and completion challenges for EOR applications, and many more.

While the oil sector is facing challenges, an increasing focus on innovative EOR techniques and applications, alongside the development of robust policies and groundbreaking solutions, is needed for the industry to remain a competitive force. Oman's oil production is being maintained and increased through steam water, polymer and other enhanced oil recovery

techniques, and the country is rapidly becoming a centre of EOR expertise in the region. The Ministry of Oil's target is for 22 per cent of Oman's oil output to be produced through EOR techniques by 2021.

OGWA boasts an exhibition sponsor line-up that includes Petroleum Development Oman (PDO), BP Oman (main sponsor), G-Energy (VIP sponsor), Abraj Energy Services, Halliburton, Occidental Petroleum Corporation, Shell (platinum sponsors), Oman Gas Company, Schlumberger, CC Energy Development (Gold sponsors), Petrofac, Port of Duqm (silver sponsors), Glasspoint Solar (associate sponsor), Dover Artificial Lift (visitor bag sponsor), and Maxitech (catalogue belly band sponsor).

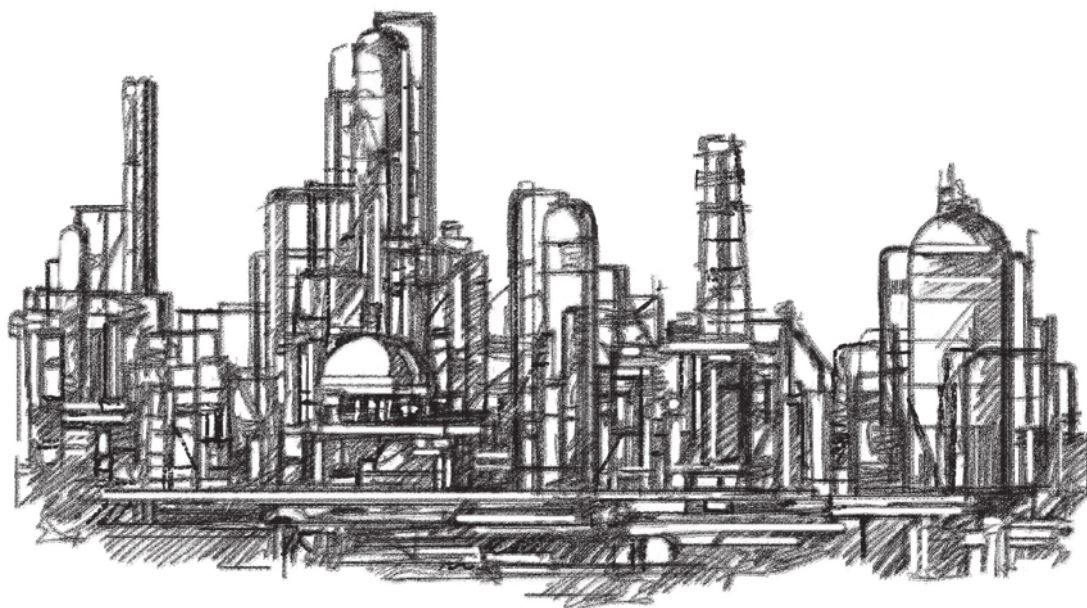
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# Showcasing advances in sour hydrocarbons

SOGAT 2016 will showcase all the latest developments in sour hydrocarbon and sulphur management.

**S**OGAT 2016, THE leading international conference and exhibition for sour hydrocarbon and sulphur management, will once again bring together representatives of NOCs, IOCs, service and contracting companies, suppliers and experts, to discuss and showcase all the latest developments in sour field management technology.

Sour gas production activity in the Middle East is driven by the demand for gas, which is projected to double over the coming years to meet power and infrastructure requirements. The UAE in particular is becoming the centre of international sour gas conditioning.



**Sour gas processing technologies are evolving fast**  
(Photo: corgarashu / Shutterstock)

The Habshan V plant, for example, which is part of Abu Dhabi's integrated gas development, is currently processing 1 bcf/d and the aim is for processed gas to rise to 1.75 bcf/d by 2017. The Shah sour gas field, with an H<sub>2</sub>S content of 23 per cent and 10 per cent CO<sub>2</sub>, is now operating at full capacity at 1 bcf/d. Projects under appraisal include Hail and Shuwaihat. Other major projects in the region include Karan in Saudi Arabia, the Kingdom's first non-associated sour gas development; the Wasit gas plant in Saudi Arabia, built to process gas from the offshore Arabyah and Hasbah sour non-associated gas fields; the Rahab Harwell Integrated Project in Oman; and the Barzan gas project in Qatar.

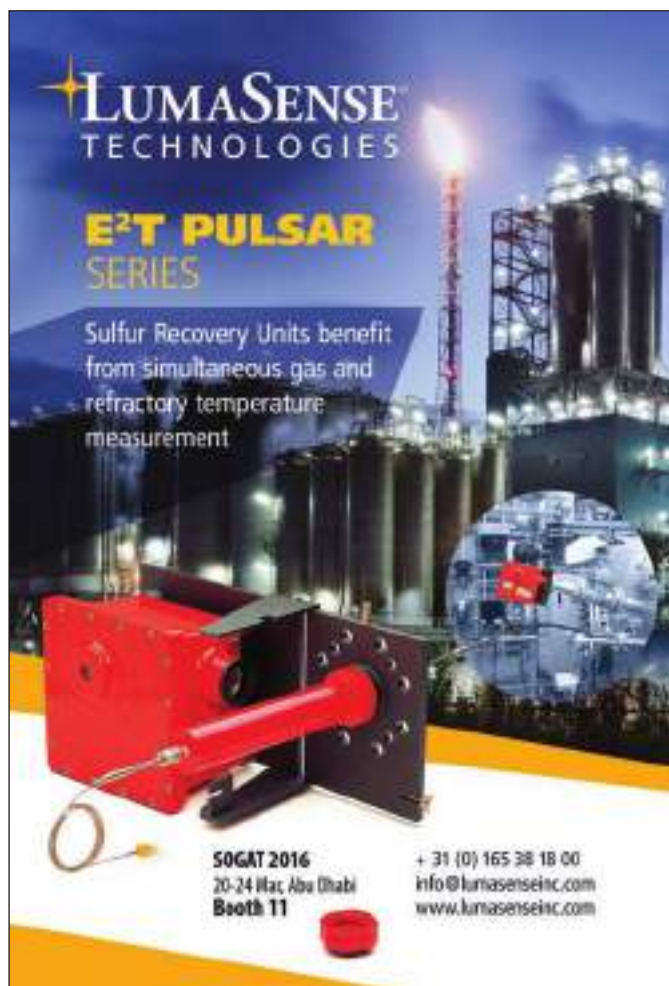
“The conference will provide a forum to discuss all the latest developments across the whole spectrum”

The conference will provide a forum to discuss all the latest developments across the whole management spectrum, from energy efficient technologies for sour gas separation, to selective sweetening processes, exotic material selection and improved field safety management standards.

The event will also include practical workshops on topical issues on surplus recovery; sour oil and gas process optimisation; dehydration of natural gas; managing BTX in lean acid gas; and implications along the sulphur supply chain in future market conditions and potential solutions.

Exhibiting companies include Al Hosn Gas, BASF, Amec Foster Wheeler, Du Pont & MECS, Fluor, LumaSense Technologies, Jacobs, and INEOS among others. ■

For further information see the website at [www.sogat.org](http://www.sogat.org).



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**GEO 2016**

Date: 7-10 March 2016

Venue: Bahrain

**GEO 2016**

# Today's geoscience, tomorrow's energy

The Bahrain International Exhibition and Convention Centre is set to play host to a critical exchange of oil and gas insights during the 12th Middle East Geosciences Conference and Exhibition (GEO 2016).

**H**ELD UNDER THE patronage of His Royal Highness Prince Khalifa bin Salman Al Khalifa, GEO 2016 will bring together more than 4,000 geoscientists and petroleum industry professionals from more than 50 countries to debate and help shape the future of the industry, build skills, network with peers and establish business relationships.

The biannual event, the largest petroleum geoscience conference and exhibition in the Middle East, incorporates a high-level conference organised by the American Association of Petroleum Geologists (AAPG), the European Association of Geoscientists and Engineers (EAGE) and the Society of Exploration Geophysicists (SEG), and a parallel exhibition organised by Arabian Exhibition Management.

The GEO 2016 conference, with the theme 'Today's Geoscience, Tomorrow's Energy' will open on 7 March with a ministerial and plenary session to set the scene.

**“We need to focus on unlocking greater efficiencies in mature areas through innovation in technology”**

In challenging times for the energy sector, Musabbeh Al Kaabi, GEO 2016 chairman, says, “As a profession, geoscience and our professional community have a crucial part to play in both addressing the immediate realities and the delivery of commercial returns, and maintaining a long-term view. We need to focus on unlocking greater efficiencies in mature areas through innovation both in technology and in the application of that technology, as well as opening up the more challenging new plays and provinces around the globe that will meet the world's ongoing demand for energy far into the future. One additional challenge, which must remain a priority, is how we maintain a steady flow of new and high quality talent to serve the industry in the decades ahead.”



**The exhibition will showcase more than 130 exhibitors**

Panel sessions, led by CEOs and presidents, will cover long-term strategies through unpredictable markets; IT emerging trends; integrated technologies for better performance; unconventional resources of the Middle East; and industry-academia engagement and collaboration. There will also be a special session entitled 'Women's Growing Role in the Energy Industry', led by top female industry professionals.

Robert Kuchinski, president of AAPG's Middle East Region and senior technical adviser for formation evaluation in the Middle East / Africa Region for Weatherford, says that he looks forward to learning about 'Tomorrow's Energy' during GEO 2016.

“We expect this energy will be discovered and produced using ideas and technologies that are new and/or haven't been thought of or invented yet. It will cover the range from new conventional discoveries, bypassed pay, EOR, unconventional resources and things we may not know about yet,” he said.

“The Middle East contains the world's largest oil and gas reservoirs distributed throughout many unique, interesting and dynamic countries. These oil and gas deposits are being developed by NOCs that are committed to producing as much oil and gas as they can, using the most advanced technology and sophisticated techniques possible,” Kuchinski said.

GEO's focus on the future also includes a robust programme of activities for young professionals and students.

The exhibition will showcase more than 130 exhibitors from 20 plus countries, including NOCs, IOCs, suppliers, service providers and country pavilions from Egypt, North America and the UK. ■

For further information visit [www.geo2016.com](http://www.geo2016.com).



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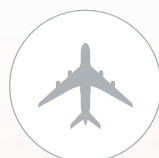
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## 4th Kuwait Oil & Gas summit to highlight ambitious expansion plans

KUWAIT IS PRESSING ahead with ambitious investment and expansion plans, with major projects including the Al Zour refinery, for which KNPC has awarded contracts worth US\$11.5bn to international consortia.

The 4th Kuwait Oil & Gas Summit, held under the patronage of the Ministry of Oil and supported by KPC and its subsidiaries, will provide attendees with the opportunity to learn about the wealth of opportunities for business development and growth in Kuwait's oil and gas sector. The event will be held from 11-12 April 2016 at the Jumeirah Messilah Beach Hotel, Kuwait.

Speakers include HE Anas Al-Saleh, Minister of Finance and Acting Minister of Oil; and the CEOs of KPC, KOC and KNPC. Conference sessions cover adapting to change and optimising Kuwait's role in world energy; driving forward project execution, achievement and opportunities; managing stakeholder relationships and enhancing co-operation; economic diversification and growth of the private sector; long-term vision for downstream; and investing in the next generation.

For further information see the website at [www.cwckuwait.com](http://www.cwckuwait.com).



**Kuwait has ambitious plans for the oil and gas sector**  
(Photo: Khaleel Haldar)

## OTC Asia to showcase technology for Asia

THE OFFSHORE TECHNOLOGY Conference Asia (OTC Asia) 2016 will be held from 22-25 March 2016 at the Kuala Lumpur Convention Centre in Kuala Lumpur, Malaysia.

Themed "Excellence in Asia" OTC Asia 2016 reflects the region's reputation for delivering excellence in technology, innovation, execution and human resources to the offshore oil and gas industry. As the largest OTC programme ever developed, it will showcase Asia's achievements, its aspirations, and the important technological developments that the region needs to stay robust and resilient in the shifting global energy market. The conference programme addresses issues from cost reduction, through innovative techniques and practices, to the management of asset value through data-driven technologies to improve efficiency and profitability.



**The event will take place at the Kuala Lumpur Convention Centre** (Photo: jobsdbmalaysia)

In opening up access to new oil and gas reserves, the industry in Asia Pacific is working with increasingly complex reservoirs, in deepwater environments and taking on EOR projects offshore. These challenges have sharpened the focus on both execution excellence, as well as innovation as a means of cutting costs. Best practices in both areas stand out in the 'Excellence in Execution' and 'Cost Reduction through Innovation' panel sessions. Delivery of the world's first LNG FPSO unit is due in the coming months. PETRONAS will showcase how its innovation in design, excellence in fabrication and project management came together in the realisation

of this ground-breaking project.

OTC Asia 2016 will also feature an exhibition encompassing 8,000 sq m with more than 300 industry exhibitors showcasing their latest products, technologies and services. Sponsoring and exhibitor organisations include prominent industry players such as Baker Hughes, ConocoPhillips, ExxonMobil, Halliburton, Malaysia Investment Development Authority (MIDA), Murphy Oil, PETRONAS, PTT Exploration and Production Public Company Limited (PTTEP), Shell and Technip. Malaysia's national oil company PETRONAS is the exclusive corporate supporting organisation.

The event is expected to draw 25,000 engineers, technicians, executives, operators, scientists and managers from all fields in the oil and gas exploration and production industry, representing more than 80 countries.

For more information and to register, please visit <http://2016.otcasia.org>.

## Tank World Expo 2016

TANK WORLD EXPO 2016, which takes place on 12-13 April 2016 at the Dubai World Trade Centre, will see the launch of several new technologies.

Knowsley SK will be displaying its latest foam mixing technology designed to accurately mix foam concentrate liquid with either freshwater or seawater; Arflu Industry Valves will be presenting its dual expanding plug valve; while Climbox S.A. will be showcasing the fully automated mobile ORECO units for cleaning petroleum tanks. Tranter Heat Exchangers will be exhibiting its range of efficient storage tank heating coils; Loadtec Engineered Systems will be highlighting its wide range of tanker loading arms; while Mascoat will be demonstrating its latest coating, which solves insulating and corrosion under insulation issues.



**The GCC is a hub for storage and bunkering**  
(Photo: Dave Crosby)

Tank World Expo 2016's conference programme will feature leading industry figures from organisations such as the UAE Ministry of Energy, OTTCO, Oiltanking Odfjell Terminals Oman, Dubai Mercantile Exchange, Burgan Cape Terminals and CITAC Africa.

Said Al Mawaali, project director at OTTCO, will be presenting on 'Latest developments at the region's largest storage facility in Oman', while Roderick de Rooij, commercial manager at Oiltanking Odfjell Terminals Oman, will be looking at the future outlook for the storage market in Oman and how to capitalise on the trade routes between Asia and Europe.

The growth of Fujairah is still a key driver in the Middle East's continued rise. It is the second most productive region in terms of bunkering capacity and the third largest oil storage and products trading centre in the world. Malek Azizeh, commercial director at Fujairah Oil Terminal, will discuss the region's crude oil storage position as a strategic regional hub for products and crude.

For more information see the website at [www.tankworldexpo.com](http://www.tankworldexpo.com).



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## International oil companies resume investments in Kurdistan Region of Iraq

DNO ASA, THE Norwegian oil and gas operator, has announced plans to resume investments at its flagship Tawke field in the Kurdistan Region of Iraq, following five consecutive monthly payments for oil exports and a new payment arrangement tied to its contractual entitlements.

DNO's executive chairman Bijan Mossavar-Rahmani said, "The export payment arrangement just put in place provides regularity, predictability and transparency, thereby laying the foundation for stepped up investments in Kurdistan."

New investments at Tawke are expected to reverse natural field decline and boost output by

at least 10 percent by mid-year, with further output increases to follow as additional investments are made, the company said. DNO also plans to drill the Peshkabar-2 appraisal well this year.

Gulf Keystone, operator of the Shaikhan field, has reported that it has also received payments in line with the statements made by the Kurdistan Regional Government in August and September 2015 regarding regular payments to the exporting international oil companies in the region.

Following the establishment of a regular payment cycle for all oil sales and arrears, Gulf Keystone

plans to move into the large-scale phased development of the Shaikhan field targeting 100,000 bpd of production capacity during Phase 1 of the Shaikhan Field Development Plan.

And Genel Energy will resume drilling work at the Taq Taq oilfield in Kurdistan Region of Iraq in coming weeks to ramp up production, according to the company, whose chief financial officer Ben Monaghan told Reuters that the restart of drilling work will mark the first time in more than a year that Genel Energy has drilled in the region to increase output from its fields. "It's a symbolic restart of our investments," he said.

## IEA sees oil market rebalancing in 2017

GLOBAL OIL SUPPLY growth is plunging as an extended period of low prices takes its toll, the International Energy Agency (IEA) said in its annual *Medium-Term Oil Market Report (MTOMR)* released on 22 February.

While US light, tight oil (LTO) output is falling steeply for now, the market will begin rebalancing in 2017 – and by 2021 the United States and Iran are seen leading production gains among non-OPEC and OPEC countries respectively, says the report.

The report notes that while oil prices should start to rise gradually once the market begins rebalancing, the availability of resources that can be easily and quickly tapped will limit the scope of rallies – at least in the near term. However, it points to the risk of an oil price spike in the later part of the outlook period arising from insufficient investment.

The IEA sees 4.1mn bpd being added to global oil supply between 2015 and 2021, down sharply from the total growth of 11mn bpd in the period 2009-2015. The drop in supply growth comes as upstream investment dries up in response to the current glut that is pressuring prices. Global oil exploration and production capital

**Global balance summary (million barrels per day)**

	2015	2016	2017	2018	2019	2020	2021
<b>World Demand</b>	<b>94.4</b>	<b>95.6</b>	<b>96.9</b>	<b>98.2</b>	<b>99.3</b>	<b>100.5</b>	<b>101.6</b>
<b>Non-OPEC Supply</b>	<b>57.7</b>	<b>57.1</b>	<b>57.0</b>	<b>57.6</b>	<b>58.3</b>	<b>58.9</b>	<b>59.7</b>
OPEC Crude*	32.0	32.8	33.0	33.0	33.2	33.5	33.6
OPEC NGLS etc	6.7	6.9	7.0	7.1	7.1	7.1	7.2
<b>Total World Supply*</b>	<b>96.4</b>	<b>96.7</b>	<b>97.0</b>	<b>97.8</b>	<b>98.7</b>	<b>99.5</b>	<b>100.5</b>
<b>Implied Stock Change</b>	<b>2.0</b>	<b>1.1</b>	<b>0.1</b>	<b>-0.4</b>	<b>-0.7</b>	<b>-1.0</b>	<b>-1.1</b>

\*OPEC actual output in 2015. Assumes a post-sanctions increase for Iran in 2016 and adjusts for OPEC capacity changes thereafter  
Source: IEA

expenditures (capex) are expected to fall 17 per cent in 2016, following a 24 per cent cut in 2015 – which would be the first time since 1986 that upstream investment has fallen for two consecutive years.

US production is seen reaching an all-time high of 14.2mn bpd by the end of the forecast period, but only after falling in the short term. LTO output declines by 0.6mn bpd this year and by a further 0.2mn bpd in 2017 before a gradual recovery in oil prices, combined with further improvements in operational efficiencies and cost cutting, allows production to resume its upward climb. The USA remains the largest contributor to supply growth during the

forecast period, accounting for more than two-thirds of the net non-OPEC increase. Freed from sanctions, Iran leads OPEC gains: Iranian oil output rises 1mn bpd to 3.9mn bpd by 2021.

The report sees global oil demand growing at an average rate of 1.2mn bpd through 2021, reaching 101.6mn bpd. Indian consumption races ahead as more motorists take to the roads, while Chinese demand growth cools in tandem with the economy. The global oil trade continues its focus towards Asia. The Middle East will consolidate its place as a major refining centre, and its products exports will grow at a rate exceeded only by the USA, the IEA predicts.

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## BP strengthens commitment to Oman, amends ESPA

BP AND OMAN Oil on 14 February signed an agreement with the government of the Sultanate of Oman to amend the Oman Block 61 exploration and production sharing agreement (EPSA). Under the amendment, the licence area of the block will be extended further over 1000 sq km to the south and west of the original 2,700 sq km Block 61.

BP is the operator of Block 61 with a 60 per cent interest and Oman Oil holds the other 40 per cent.

The extension will usher in a second phase of development, accessing additional resources in the area that have been identified by drilling activity within the original block. The development of this additional resource is subject to final approval of the government of Oman and of BP.



**The full field development of the Khazzan project, one of the Middle East's largest unconventional gas resources, will involve a drilling programme of around 300 wells over 15 years (Photo: BP Images/Flickr)**

The agreement was signed in Muscat by Oman minister of oil and gas HE Dr. Mohammed Al Rumhy, BP Group CEO Bob Dudley, and Oman Oil E&P executive MD John Malcolm.

HE Dr. Mohammed Al Rumhy said, "I am delighted to see BP taking additional acreage that will result in realising more gas reserves and more production of gas that our country needs to support our energy planning and requirements."

Bob Dudley stated, "Khazzan is a major resource with the potential to produce gas for Oman for decades. This expansion of its

development will build on the success we are already seeing in our work on the first phase, working closely with our Omani partners and applying BP's leading technology and extensive tight gas experience. It clearly demonstrates our commitment to continue to invest in a superior project that will deliver long-term value to both BP and Oman."

Production from the Khazzan reservoirs in Block 61 is set to make a significant contribution to ensure a stable and long-term domestic supply of gas for Oman. Combined plateau production from Phases 1 and 2 is expected to total approximately 1.5 bcf/d, equivalent to about 40 per cent of Oman's current total domestic gas production.

The Phase 1 project, sanctioned in December 2013, remains on schedule to deliver first batch in late 2017.

The two phases are expected to produce 1.5 cfd through development of 10.5 tcf of recoverable gas resources. This will involve construction of a three-train central processing facility with associated gathering and export systems and drilling around 325 wells over a 15 year period.

## Egypt's Ministry of Petroleum approves Zohr gas field development

EGYPT'S MINISTRY OF Petroleum & Mineral Resources has completed authorisation of the Zohr development lease which allows Egyptian Natural Gas Holding Company (EGAS) to grant Eni the privileges to develop the gas field located in the Shorouk Concession, offshore Egypt.

The development plan is expected to start production by the end of 2017 with a progressive ramp up until it reaches a volume of 75 mcmd – approximately 500,000 boepd – by 2019. The quick realisation of such a large project is believed to become possible through cooperation with Petrojet, Enppi and Saipem contractors, who have been a part of Eni's development activities in Egypt.

The discovery of Zohr was announced on 30 August 2015 following the drilling of the Zohr-1 well which occurred within the Shorouk Concession Agreement, in which IEOC is the sole operator. Currently in the drilling phase is Zohr-2, the first appraisal well of the Zohr discovery.

The 'super giant' offshore Zohr field is predicted to hold 849.5bn cu/m of gas, covering an area of about 100 sq km.

Eni said that the discovery was located at a depth of 1,450 metres, adding that it planned to fast track development of the site, using existing infrastructure. It said yet more gas might be uncovered in future drilling.

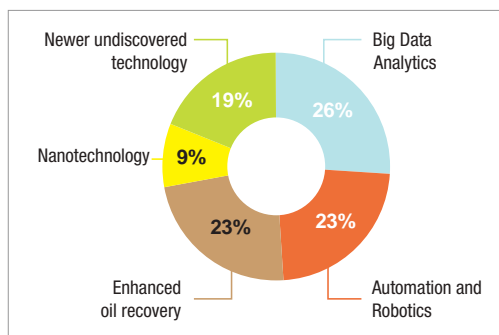
The development of the Zohr field is set to play a major role in closing Egypt's energy gap.

## Disruptive technologies will pave the way to energy progress, says survey

A WHOPPING 77 per cent of the respondents in a Gulf Intelligence Industry Survey believed that disruptive technologies will accelerate the transformation of the oil and gas industry in a low price era.

The Survey was conducted among 250 energy professionals in the Middle East, of whom 26 per cent cited big data analytics as the most significant game changing technology in the energy sector. It was closely followed by automation and robotics and enhanced oil recovery, both at 23 per cent. Fewer respondents (nine per cent) said nanotechnology will spearhead the energy sector's transformation, with 19 per cent saying that all aforementioned technologies will be made redundant by even newer technologies that humans have yet to create.

Technological innovations have the power to trigger dramatic improvements to companies' operational productivity and economic efficiency in less than a decade. A disruptive technology is a tool that has the capability to replace an established technology, such as digitized data



**Representation of the survey data from 250 respondents highlighting what they believe are the game-changing technologies**

sets replacing the use of PDFs at oil fields.

There are many speculations at this point about which technologies are most likely to succeed, and a single technology in itself holds potential for many industries. Automated image analysis that is used by security forces for facial recognition and by doctors for digital pathology could be used to determine drill bit damage in the oil and gas sector, for example.

Crossover technologies also fall under the umbrella of disruptive technologies, acting as a shortcut to costly and time-consuming research and development (R&D) that seek to create innovations from scratch.

Still, over half (57 per cent) of respondents said international and national oil companies do not need to open innovation hubs, like the

USA's Silicon Valley, to tap into the best information and communications technologies.

Instead, they believe that the Gulf countries' private and public sectors must be encouraged to nurture a local culture of innovation to help boost economic and operational efficiency.

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## Kuwait seeks US\$10bn loan for Clean Fuels Project

KUWAIT NATIONAL PETROLEUM Company (KNPC) is seeking to borrow US\$10bn from local and international banks for the country's Clean Fuels Project to upgrade two refineries.

According to Ahmad Al-Jemaz, deputy CEO of Mina Abdullah refinery at KNPC, local banks are due to agree next month to lend US\$3bn under favourable terms to Kuwait. The rest of the US\$10bn will be sought from international lenders. The loans will be for Kuwait's Clean Fuels Project to upgrade the Mina Abdullah and Mina Al Ahmadi refineries.

"We have seen a good response to our request for loans to finance the project," Al-Jemaz told reporters in Dubai. "These projects are relatively low-risk because they're being carried out by government-related entities or are public-private partnership projects."

The loans are required to upgrade the Mina Abdullah and Mina Al Ahmadi refineries. The project, set to be completed by 2019, will produce diesel and jet fuel for domestic use and export. The hydrocracker unit at Mina Al-Ahmadi has started producing 42,500 bpd, according to Kuwait's official news agency Kuna.

The Mina Abdullah refinery's capacity will be increased to 454,000 bpd from 270,000 and the Mina Al Ahmadi plant's capacity will be decreased to 350,000 bpd from 466,000 bpd as one of its main crude processing units is retired, Al-Jemaz said.

Kuwait is also planning a US\$30bn refinery to produce 615,000 bpd, a petrochemical plant and an LNG receiving terminal at Al Zour on the Persian Gulf coast. Financing options include selling shares to the public in the petrochemical unit and joint ventures.



**KNPC is seeking the loan to be able to upgrade two refineries to produce cleaner burning fuel (Photo: Hourann Bosci/Flickr)**

## Maire Tecnimont signs MoU worth US\$1.1bn with PGPIC

ITALIAN ENGINEERING AND contracting firm Maire Tecnimont has signed an MoU with the Persian Gulf Petrochemical Industries Co. (PGPIC) worth an estimated US\$1.1bn. The agreement will see the two firms collaborate in the construction of refineries and petrochemical research. This includes providing finance, parts and equipment as well as solutions to Iran's processing issues, Mehr news agency reported.

"Italy is seeking to open a new chapter in its cooperation with Iran, especially in the oil and petrochemical industries," said Maire Tecnimont CEO Pierroberto Folgiero on the sidelines of the signing ceremony in Tehran.

The deal was signed by Folgiero during a ceremony with PGPIC management. Folgiero

confirmed the Italian company will help Iran build an acrylonitrile butadiene styrene (ABS) facility as well as a rubber plant in Asaluyeh.

PGPIC is one of the largest petrochemical holding companies in the Middle East region. It operates 15 manufacturing and service companies mainly focused in Iran. Maire Tecnimont provides a range of engineering and construction services for the oil and gas, chemical and petrochemical, energy, infrastructure and civil engineering sectors.

Last month, Italy's Saipem signed an MoU with the Parsian Oil & Gas Development Company to cooperate on major oil and gas projects in Iran. The deal is worth around US\$4.5bn and involves the revamping and upgrading of Shiraz and Tabriz refineries and building 2,000 km of pipeline in Iran.



**Iran's 20-year plan targets producing US\$70bn of petrochemicals a year at current prices (Photo: Photo Smile/Shutterstock)**

## Board directors of Saudi Aramco and Dow witness Sadara progress

FOUR YEARS AFTER they gave the green light to develop the Sadara joint venture, the boards of directors of Saudi Aramco and The Dow Chemical Company (Dow) visited Sadara Chemical Company's (Sadara) industrial complex, to witness how this mega project – the largest plastics and chemicals complex ever built in a single phase – has developed, and commemorate the first product produced at the site. The complex, involving a total investment of US\$20bn, is located in Jubail Industrial City II, in Saudi Arabia's Eastern Province, and is now 98 per cent complete.

The visit was headed by the Saudi Aramco chairman, His Excellency Khalid Al-Falih, and Dow chairman and CEO, Andrew N. Liveris.

Sadara successfully launched its first manufacturing unit – Solution Polyethylene – in December 2015, the first Solution Polyethylene plant in the Middle East. A phased commissioning and start-up of the rest of the facilities is continuing, and the complex is expected to achieve full operations by 2017.

During the visit, Al-Falih said, "Sadara represents a bold undertaking for both Saudi Aramco and for Dow. For us at Saudi Aramco, it is a major driver in achieving our goals of greater integration and value addition."

Liveris added, "Sadara is much more than a value-add powerhouse and a vital hub of advanced manufacturing. By combining globally competitive feedstocks with cutting-edge innovation, Sadara will generate billions of dollars in revenues and create thousands of jobs."

Ziad Al-Labban, CEO of Sadara, commented, "Through leveraging Saudi Aramco's vast hydrocarbon resources, mega-project expertise, and infrastructure, and Dow's market-leading state-of-the-art technologies and

global network, we are confident that the differentiated products Sadara will produce will create new value chains to support the growth of our customers, and accelerate the development of Saudi Arabia's downstream manufacturing industry."

During the visit, the group was updated on progress of the adjacent PlasChem Park, where investors can utilise Sadara's products as feedstock for further conversion to finished products. A number of supply agreements between Sadara and prospective PlasChem tenants have been previously announced:

- Supply agreements for ethylene oxide and propylene oxide with Energy Chemical Sources Company, a joint venture between Halliburton and TAQA, to produce chemicals for the oil and gas industry.
- Two supply agreements with E.A. Juffali & Brothers – one for methylene diphenyl diisocyanate (MDI), to be used in polyurethane system house applications, and the other for butyl tri-glycol ether (BTG), for the production of brake fluids.

To date, Sadara has more than 4,300 employees and more than 60 percent of them are Saudis. Almost 2,000 of these employees have completed or are now completing intensive, technology-centric, on-the-job training programmes at various Saudi Aramco and Dow sites, in Saudi Arabia and around the world.

The training is designed to equip them with knowledge of the advanced chemicals production technologies used at the Sadara chemical complex, and the skills necessary to perform their respective roles.

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# Bahrain shuffles the energy pack

It is shaping up to be a critical year for Bahrain, as state oil company Bapco grapples with refinery upgrades, gas imports and a new cross-border oil pipeline, says Martin Clark.

**B**AHRAIN REPRESENTS ONLY a small part of the Gulf's vast energy infrastructure, but, in a sense, it was here that the Middle East's world oil domination all began years ago.

One of the first countries in the region to discover oil and build a refinery, Bahrain can be considered something of a pioneer even though it never went on to reach the lofty production heights of neighbours like Kuwait and Saudi Arabia.

It was way back in 1932 that the Bahrain Petroleum Company (Bapco), a subsidiary of the Standard Oil Company of California, first discovered the Awali field, with the country's Sitra refinery built a few years later in 1936.

A lot has changed since then, of course, but one ever present face in the industry has been Bapco, now wholly owned by the Bahraini government.

It has led the development of the nation's upstream and downstream industries through the intervening decades – not to mention Gulf wars and any number of energy price fluctuations – creating a platform for wider development.

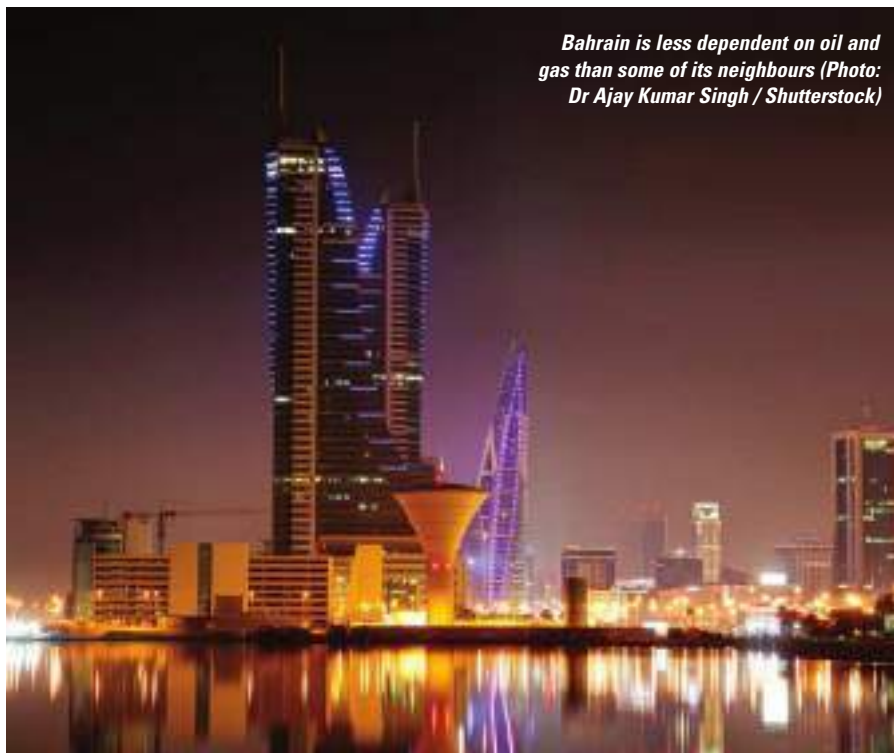
Bahrain's energy industry may be small in size compared to other Gulf states, but it has allowed the government to create a more balanced and diversified economy overall in comparison to peer states. The oil and gas sector today represents only around a fifth of Bahrain's gross domestic product.

## Sitra refinery expansion

Nonetheless, there is plenty going on in Bahrain's compact energy sector, with the expansion of the refinery the largest single project on the table.

The Sitra refinery (also known as the Bahrain refinery) is performing well after a series of modernisations through the years, recording production at close to capacity of around 265,000 bpd in 2015.

Indeed, product exports last year reached their highest level since 2010, some 92mn barrels, including diesel, jet fuel, naphtha, among others – all the more impressive given the current volatility of oil markets.



*Bahrain is less dependent on oil and gas than some of its neighbours (Photo: Dr Ajay Kumar Singh / Shutterstock)*

“Product exports last year reached their highest level since 2010”

Bapco now wants to raise capacity significantly at the Sutra facility, however, potentially up to 360,000 bpd by 2020, in a project that could cost as much as US\$5bn.

A final investment decision is expected this year, with project economics no doubt factoring in the current slump in global energy markets.

Any decision would also weigh up an apparent glut of refining capacity that has emerged following the construction of other facilities and plant expansions in Saudi Arabia and the UAE.

Still, upgrades through the years have enabled the current refinery to produce state-of-the-art clean fuels for the market, commanding a higher premium among buyers.

The next phase is a refinery configuration project to integrate new units into the existing facility, which will be overseen by Australia's Worleyparsons, which landed a A\$120,000 consultancy contract recently.

Technip was awarded the front-end engineering and design work for the main refinery upgrade in 2014.

## Saudi pipeline project

A key part of this strategic refinery upgrade is the creation of a new 350,000 bpd pipeline to be built by Saudi Aramco and Bapco to carry more crude oil in from across the border.



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Bahrain currently relies on output from the Abu Safa oilfield that it shares with Saudi Arabia for the vast majority of its oil.

The proposed US\$300mn link - to be funded by nogaholding, an investment vehicle which holds the Bahraini government's oil and gas assets - would replace an older onshore pipeline with a 230,000 bpd capacity. The two sides signed contracts for the project late last year.

And the new pipeline's capacity could be increased to 400,000 bpd, according to Bahrain's energy minister Abdul-Hussain bin Ali Mirza.

Speaking at a contract signing event in Manama last September, he said the project "will be finished by the end of 2017 or early 2018" and then there will be a six-month trial period for the new pipeline, which will run over 115 km, covering both onshore and offshore terrain. He added that the old pipeline was likely to be removed from service in the second half of 2018.

Agreements to build the pipeline were signed with Saudi Arabia's Al Robaya Holding Company and the UAE's National Petroleum Construction Company.

The decision to build the new pipeline is perhaps the clearest indication that the refinery boost will go ahead, despite the current uncertainty plaguing energy markets.

## Upstream developments

Certainly compared to its near neighbours, Bahrain's upstream oil and gas sector

remains fairly modest.

It was in the early 1970s that production peaked at the Awali field at more than 75,000 bpd, but this has fallen back through the years.

Undeterred, Bahrain has brought in technical help to restore the field to its former glory, signing a 2009 deal with the USA's Occidental Petroleum and Mubadala Development Company of the UAE to return capacity and potentially lift combined oil and gas output to as much as 100,000 bpd.

“The price of gas is another concurrent challenge that Bahrain faces”

National Oil & Gas Authority of Bahrain is also a partner in the upstream initiative, known as Tatweer Petroleum, which is deploying complex steam and water-flooding techniques to lift flow rates.

The last concrete production figures, for 2014, show crude and condensate output averaging 48,800 bpd, while non-associated gas averaged 2.31 bcf per day.

Pulling more gas out of the ground has become important as demand for energy has grown.

Last year, Britain's Petrofac won a US\$100mn contract to build a 500 mmcf

gas dehydration facility for Tatweer Petroleum.

The government has also attracted interest in exploring the country's deep gas potential, utilising advanced drilling techniques to target new rock formations although this has not, as yet, had any material impact on production.

The price of gas is another concurrent challenge that Bahrain faces, with heavily subsidised tariffs – equally common across the Gulf – undermining commercial realities and potentially deterring would-be investors seeking a return on upstream ventures.

Like the UAE, Kuwait, and a number of other regional states, Bahrain has had to face up to gas shortages as a result of limited production and strong energy demand.

## LNG imports

The short-term plan is to counter this with imported gas supplies.

In December, the government awarded a contract to newly formed joint venture Bahrain LNG to build a floating LNG terminal that will filter gas from overseas into the domestic economy for industrial and consumer use.

Bahrain LNG groups nogaholding with an international consortium of Teekay LNG, Samsung C&T and the Gulf Investment Cooperation (GIC).

The project, to be developed on a 20-year Build-Own-Operate-Transfer basis, will be located in the Hidd Industrial area and will have an initial capacity of 400 mmcf (expandable to 800 mmcf), with supplies commencing in July 2018.

GS Engineering & Construction has been selected as the EPC contractor to build the project, which will cost an estimated US\$660mn.

Energy minister Mirza said the LNG terminal will form a vital part of Bahrain's energy infrastructure of the future, giving the country greater security of supply for large industrial projects, power generation and water for enhanced oil recovery.

"Gas demand is rising and we foresee that gas demand will increase significantly going forward as new industrial projects in the pipeline are developed," he said.

Between 2011 to 2014, Bahrain's gas demand rose at an average rate in excess of 2.5 per cent per annum, with most of that increase sourced from the Khuff gas field.

Mirza said it was imperative that the country provides itself with an option to access competitive and economic gas supplies from the global market.

"The LNG terminal provides Bahrain with that option, giving it both an insurance policy in case of potential shortages of gas, and the ability to supplement domestic gas supplies with gas from LNG." ■



*The expansion of the Sitra refinery is on the cards (Photo: Bapco)*

## Commitment to clean energy



**HE Dr. Abdul Hussain Ali Mirza (second from left) at the WFES ministerial panel session**

BAHRAIN'S MINISTER OF energy, HE Dr. Abdul Hussain Ali Mirza, stressed Bahrain's commitment to energy efficiency and renewable energy development at the World Future Energy Summit (WFES) held in Abu Dhabi in January. He said that the country's Intended Nationally Determined Contribution (INDC) submitted to COP21, focuses on four areas, which would involve the private and public sectors working together: energy efficiency and the reduction of CO2 emissions; carbon capture; renewable energy; and the establishment of a sustainable energy unit to drive forward the kingdom's INDC commitments. The minister pointed out that all the main state companies, such as Bapco, Banagas and Tatweer Petroleum, have implemented energy efficiency and carbon capture programmes. He added that Bahrain invested US\$300mn in renewable energy in 2015, which is expected to rise to US\$500mn by 2020 and US\$900mn by 2030, and is encouraging technology research in new areas. The minister said that Bahrain had reduced subsidies for diesel and gasoline, expressing the hope that the move to reduce subsidies throughout the Gulf would encourage further development of renewable energy.

## Gas plant contract signed

JAPANESE ENGINEERING FIRM JGC has won a US\$355mn contract to design and build a mid-size gas plant for Bahrain National Gas Company (Banagas).

The facility will recover for export liquefied petroleum gas (LPG) and naphtha from associated gases released when extracting crude oil from the Bahrain oilfield. The plant, slated for completion by September 2018, will be located around 20 km south of Manama and have a daily processing capacity of 9.9mn cu/m. It is reported to be one of the largest projects implemented by the company in terms of capital, energy utilisation and providing job opportunities to Bahrainis.

JGC has a long history of involvement in the kingdom and has carried out a number of projects since the 1970s, including the construction and expansion of several gas processing plants.

In a speech made at the contract signing ceremony, Bahrain's Minister of Energy HE Dr. Abdul Hussain Ali Mirza, said that the agreement represented a significant milestone for Banagas and added to the achievements of the energy sector in Bahrain. He stated that the project is an extension of the strategic investment moves made by the National Oil & Gas Authority (NOGA) in 2015, when several projects were implemented, including a US\$600mn floating liquefied natural gas (LNG) terminal to handle and process gas imports; a US\$350mn oil pipeline project between the Kingdom of Bahrain and the Kingdom of Saudi Arabia; a US\$100mn gas dehydration unit, a Tatweer Petroleum facility aimed to meet the growing domestic gas demand; and a gas supply agreement between the Bahrain Petroleum Company (Bapco) and Aluminium Bahrain (Alba), which added a sixth production line with the deal.

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*Progress is Life*

# Helping to promote efficiency in the downturn

Emerson Process Management is going from strength to strength in the Middle East, as companies seek to become more efficient in the downturn. *Oil Review* spoke to Mike Train, the company's president, global sales.

**"T**HE MIDDLE EAST and Africa is a significant market for us, accounting for around 10-12 per cent of our global revenues, and we've been investing in the Middle East in a sustained fashion to get closer to customers and enhance our capabilities in the region," says Train.

The process automation giant has recently tripled floor space and enhanced the manufacturing capabilities of its Jebel Ali facility. It now has manufacturing and service capabilities in the UAE, its main regional hub, as well as Saudi Arabia, and service centres in several other countries, including Qatar and Iraq.

"We are now producing a good part of our global delivery in the

region, which cuts down time and supply chains," Train adds. "We have a number of experts based in the Middle East, offering consultancy services, project management, and life cycle support. And we keep on adding more and better capabilities in the UAE and across the region. So over the last 10 years we've really evolved our presence here.

"Iraq is still proceeding with significant spend and has been very receptive to our solutions, particularly around using wireless as a fast and easy way of implementing solutions in the field. Our operations are

going well in Qatar, Kuwait has been great at adopting new and innovative ways of doing things, and we are seeing our business grow in Saudi Arabia, where they are interested in solutions that make a difference and are continuing to invest at a sustained pace."

While the company

serves a number of markets that use process automation, oil and gas is the largest market for its sales globally. "We've felt some impact from the drop in the oil price across our oil and gas business globally; we saw demand slacken off initially for maintenance and replacement items and then saw projects being postponed," remarks Train. "However other parts of the business, such as power generation and downstream chemicals, have experienced reasonable activity.



**Mike Train, president global sales,  
Emerson Process Management**

**“ Our Middle East oil and gas business has actually grown, as operators are still investing with a long-term view”**

"In the Middle East the picture is somewhat different; our Middle East oil and gas business has actually grown, as operators are still investing with a long-term view, and are motivated in different ways. But they're clearly affected by the price drop, and are seeking to be more efficient."

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## Growth areas

"One area that has been growing strongly is the midstream sector – ie pipelines and terminals," Train continues. "The resetting of the global energy balance means that energy is flowing in different directions around the world, and there has been a lot of investment in logistics, commercial capabilities, storage and transportation. We are looking to create more solutions in this area – this is a pretty big focus for us."

Explaining how Emerson's solutions can promote labour efficiency and reliability, Train comments, "We can use a piece of automation to gather information electronically and eliminate the need for manual input. We also have tools that can promote more reliable plant, platform or pipeline operations by, for example, giving an early warning of potential problems to avoid unplanned shutdowns. While our energy management solutions can really impact the bottom line for customers, as the cost of energy is typically high for most of the industries we serve."

Emerson recently secured a major project win in Egypt, where it has been selected to provide automation and reliability technologies and services for Carbon Holdings' US\$6.9bn Tahrir Petrochemicals Project at Ain Sokhna, which will be the largest petrochemicals plant in Egypt and the largest naphtha cracker in the world when completed. Emerson will apply best practice technologies and services to help ensure the facility is completed on time and within budget. Engineering services will include designing the plant for optimum availability and a robust reliability programme that includes consulting services, equipment health monitoring and a reliability service centre for ongoing support and expertise.

"Safety and security solutions are also in demand," Train continues. "We want to enable things digitally without compromising security. The technology is now available to enable people to operate remotely and use expertise from multiple locations, as well as to keep people out of hazardous locations."

When updating or making new investments, we need to consider how we can build in remote and collaborative types of features and systems in the future."

“The current environment is prompting people to take a step back and question old paradigms”

Emerson's integrated operations command centre (iOps) was one of the company's main focuses at ADIPEC 2015. With the use of smart technology and sensors, this enables the sharing of data in real-time from various locations, facilitating a collaborative workflow, fostering more effective decision making and enabling a swift reaction to critical events. A scenario demonstrated was one where an offshore field and onshore processing facilities, tank farm and terminal were being run from a remote Integrated Operations Command Centre. There were equipment issues that the system brought to the attention of the staff in the Command Centre, and it was possible to perform root cause analysis remotely, and quickly send the right parts and people to fix these problems.

"At ADIPEC we demonstrated several new technologies we haven't featured before," says Train. "We've built up our capabilities in pervasive sensing, enabling a lot more measurements to be taken to operate the complete business for the customer – it goes way beyond process control. We've been building out a broad set of measurement capabilities and have reduced the cost of capturing those measurements, using analytics to digest them and presenting them through dashboards to customers. We've been actively developing additional products in this space, and developing our wireless capabilities."

While Emerson's customers have traditionally been the instrumentation control departments, the company is now looking to broaden its customer base to departments concerned with areas such as energy management, environmental control, human resources as well as to CFOs themselves, raising awareness around how automation can benefit their businesses.

The current environment is prompting people to take a step back and question old paradigms, Train comments. "We've developed some great technologies, as have other suppliers, but they're not always readily adopted, because thought processes need to change. Now there is more receptiveness to change management. Projects have become more complex and expensive, costs have been going up, schedules getting tougher, overspends becoming more commonplace. In the current scenario we're really having to be careful and have been raising the discussion with industry around project certainty and better projects; how do we collectively reset the costs, get the schedule variances closer, become more efficient, eliminate duplication and unnecessary work? How can we automate processes to help us do things more efficiently? Can systems self-automate the documentation, self-setup and download the instruments to autoconfigure, for example? The low oil price might be with us for a long time – if that's the case we're going to have to find better ways of working. How do we get people to change, how do we get the leaders to lead the change?"

"It's helped us to shed some of our own paradigms too; we're making changes to the way we work and streamlining our business units, in line with our customers."

## The next step

So what's next for Emerson in the Middle East? "Our next project is a Dubai Solutions and Educational Centre in our Dubai facility which we'll be launching in June, along the lines of similar centres we operate around the world," says Train. "The Centre will have advanced global conferencing capabilities, a solutions theatre, an immersive experience facility, and a training facility. This will enable our customers to have discussions in a collaborative space about the challenges they face in specific industries or applications, and talk to our experts to see how we can help them with different approaches and solutions; ie it will operate as a high level customer experience centre."

Emerson recently broke ground on the site for its new technology development, customer training, and project support facility in Dhahran Techno Valley in Saudi Arabia, which will provide services and support to the oil and gas, mining and other process industries across the Kingdom,



The signing of the MoU with Carbon Holdings (Mike Train is second from right)

*The ground-breaking of the Dhahran Techno Valley facility*



developing automation solutions, delivering lifecycle services, and training local talent. It will lead to greater collaboration between Emerson, its customers and local universities, complementing the company's manufacturing capabilities in Jubail.

"A major concern of our customers is their people, and investing appropriately to foster the right skill sets as the older generation retires and the new generation

“ This will enable our customers to have discussions in a collaborative space about the challenges they face in specific industries or applications”

comes up through the ranks,” comments Train. “We are very proactive in the education space, and are able to deliver programmes whether on-site, in our centres, on-line or through a blended approach. This is a big focus for us, and has been very much welcomed by our customers as they look for ways to impart the required skills to enable their businesses to move forward.” ■



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# Inter-OPEC competition hots up

The return of Iranian production after sanctions, amid continued growth in Iraq and high Saudi production levels, means competition for the all-important Asian market is getting tough. Sam Ciszuk reports.

**T**HE GLOBAL OIL market remains oversupplied, and there are concerns over the extent of remaining storage space, with the prospect of at least another year of high stock builds. Market optimists hold out for supply and demand to converge in the latter parts of the year; however, demand growth is likely to slow from last year's record levels, not least given the slowing economic growth rate in China. While non-OPEC supply, particularly US shale production, has started to decline, it is far from reaching a pace at which it alone could bring supply into convergence with demand this year.

Iran, freed from its international constraints, emerges the foremost weight on any balancing of supply and demand in the coming 12-18 months, with its plans to introduce crude volumes to the market previously denied by sanctions. Iran is not alone in planning for growth, either. Iraq is still hoping for some further volumes to be delivered to the markets from its collection of slowing megaprojects. This means that internal OPEC cooperation is under greater threat than any possible cooperation with non-OPEC exporters, where interests could relatively easily converge.

OPEC quotas are currently not relevant, as most member states have been producing to full capacity for several years, while a few members, chiefly Saudi Arabia, Iraq, Kuwait and the UAE, have raised their output since the financial crisis in order to balance market tightness in the 2011-2014 period, or in Iraq's case, in order to market the output from its megaprojects. Moreover, non-OPEC growth has been stellar in the last few years, creating a structural oversupply in the crude market. As the now well-known narrative goes, output cuts by OPEC would just transfer market shares to growing suppliers elsewhere, particularly in the USA. That narrative holds true on a strategic level, however, focusing entirely on this misses a more tactical point. The market shares most strongly fought over today are



*Iraq is bringing new volumes on to the market  
(Photo: rasoulali / Shutterstock)*

the Southeast and East Asian market in general and the Chinese market in particular. The fight over those does not stand between OPEC and US shale oil exports – now that those are allowed – but chiefly between Gulf OPEC members themselves, with Russia on the margin.

“An overwhelming majority of the crude exported from the Gulf goes eastwards”

An overwhelming majority of the crude exported from the Gulf goes eastwards, and Asia is also the region set to dominate global demand growth in the coming decades. Hence, building, holding and strengthening market share there is of strategic importance. Saudi price postings since the second half of 2014 have frequently displayed the kingdom's interest

in maintaining and defending its Asian exposure, and as Iran emerges from sanctions, it will be interesting to see whether the very generous credit lines and payment terms offered to its remaining clients since sanctions started, will be rolled back in their entirety.

Iran now faces a long and costly way back, in trying to place in effect new volumes on the market at a time of oversupply and the direct pressure this is going to put on the oil price. Iraq, on the other hand, has, like Saudi Arabia, Kuwait and the UAE, been able to gain benefits from Iran being denied much of its market share, but has also had a hard time taking full advantage of them.

Like Iran, Iraq has brought new volumes to the market and has had to find buyers. Its efforts have at times been hindered by quality problems, as well as doubts over the country's reliability. Asian buyers are among the most political-risk savvy, in the sense that they have for decades been willing to pay a very visible premium for security of supply. Doubts over Iraq's stability as an



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exporter have benefitted other Gulf producers, as well as suppliers further afield, such as West African and South American producers.

## Progress in quality issues

With regard to quality issues, however, Iraq has been able to make more headway. The changes in crude flows and production stemming from Iraq's megaprojects have for some years now caused fluctuations in the quality of the southern export grade, Basra Light. New production from previously untouched horizons and, more importantly, increased production from some of the large southern oilfields, pushed the grade in a decidedly more heavy-sour direction. Uneven flows, however, made the impact unpredictable. The uneven quality resulted in cancellations even to the point of ships rejecting loadings at Iraq's southern terminals, while discounts over the past years became common.

In order to mitigate the problem on a permanent basis, Iraq's State Oil Marketing Organisation (SOMO) last year started marketing a new crude grade – Basra Heavy, which has quickly mended the situation for

SOMO. Uptake has been very good and quality has stabilised quite quickly around 23.81 API degrees. Output fluctuated in the second half of the year, as a result of the more systemic issues with Iraq's oil output, but August saw purchases topping 900,000 bpd, although the average for the June-December sales of the grade came in at 735,000 bpd. SOMO is hoping to be selling 1.1 mn bpd within three years, meaning that Basra Heavy is seen as the main growth grade in its forecasts. In June 2015 Chinese buyers imported only around two million barrels of Basra Heavy, however, by the end of the year Chinese companies were importing 10 mn barrels per month, an average for the period of 3.6 mn barrels per month. India came in not far below that, with imports averaging 3.3 mn barrels per month during the seven month period the crude was marketed. By the end of the year, a significant uptake was also noted in Japan, however, for the seven month average, 34 per cent of the Basra Heavy quality ended up being sold to Europe, with considerable amounts of that being diverted to the USA en route.

Having successfully established a new

crude grade and overcome one of its main marketing challenges, Iraq is reluctant to back down. So is Iran as it starts delivering higher volumes of exports. Competition, mainly between Saudi Arabia, Iraq and Iran, is already taking place and is likely to deepen further.

Announcements like the mid-February agreement between the Saudi, Qatari, Venezuelan and Russian oil and energy ministers to freeze production levels at current levels – if other main producers agree – hence carry an irony, given the existing oversupply and Asian market share tension. Moreover, such a statement is a challenge to Iran, which is just embarking on the recovery of its former market share and now yearns to reap the dividend of sanctions being lifted. More supply will have to come off in other parts of the world and alleviate the competing position of the Gulf producers through global knock-on effects, before the main players will all find themselves in a position from which it makes sense to negotiate, even from a purely market-oriented perspective. For Asian buyers in particular, that is good news. ■



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# Do away with offshore garbage the MAC way

The first containerised garbage converter by Marine Assets Corporation (MAC) not only disposes of waste, but makes it 'disappear' altogether. An exclusive report by *Oil Review Middle East*.

**A**S THE WORLD'S population continues to expand and technology advances ever further, garbage production continues to increase along with associated problems such as stench, harmful bacteria and pollution, leading to disease and untold misery for many.

Now imagine that garbage as we know it became a thing of the past and that there was a system to convert it into a useful fuel, with an added by-product – water. Imagine also the implications this would have on mankind, wildlife and the environment.

Marine Assets Corporation (MAC), along with its partners, has developed a unique containerised system to do exactly this. Launching first in the Middle East, the Garbage Converter Container can tackle waste from onshore and offshore facilities and remote islands as well as municipal, retail and domestic waste.

To deal with larger volumes of waste offshore, the company has also developed the Garbage Converter Vessel, designed to deal specifically with garbage accumulating on remote oil rigs and remote offshore facilities. The vessel collects rig garbage on-board and converts it into refuse derived fuel

(RDF) whilst operating in the field, reducing the need for costly trips back and forth to shore. The vessel can, at the same time, be utilised as a supply and emergency vessel equipped with firefighting equipment as well as deploying oil spill and recovery systems.

“Launching first in the Middle East, the Garbage Converter Container can tackle waste from on and offshore facilities and remote islands as well as municipal, retail and domestic waste.”

Andy Walker, sales director at MAC, said, “We looked at the current problems specifically offshore and quickly identified that firstly, there is problem with garbage; secondly, nobody appeared to be doing anything about it; and thirdly, the problem is getting bigger by the day.”

The DNV-specified containerised unit reduces the volume of the waste by up to 80 per cent whilst also reducing the weight by as much as 50 per cent by utilising its unique patented evaporation technology to remove the water content from the garbage.

## The concept

Raw garbage, either loose or in bin bags, is thrown into the converter chamber and the lid is closed, creating a vacuum environment. Once the cycle begins, the blades inside the chamber rotate at a high speed to grind and macerate the waste. The resultant friction causes the garbage temperature to rise to around 85°C, releasing the moisture content of the garbage. Once the moisture content is removed the temperature, again through friction, rises to around 115°C, which sterilises the waste. Due to the vacuum environment created by the process, there is no smell during or after the cycle. Safety and shutdown features protect the system at all times during the cycles, along with user identification and password protection to avoid unauthorised access and operation of the system.

## The outcome

Dry, sterilised inert processed garbage or RDF resembling 'fluff', is then dispensed into a holding bin that contains a sealable vacuum bag. The RDF can be stored for months before being used as a fuel substitute or being disposed of.

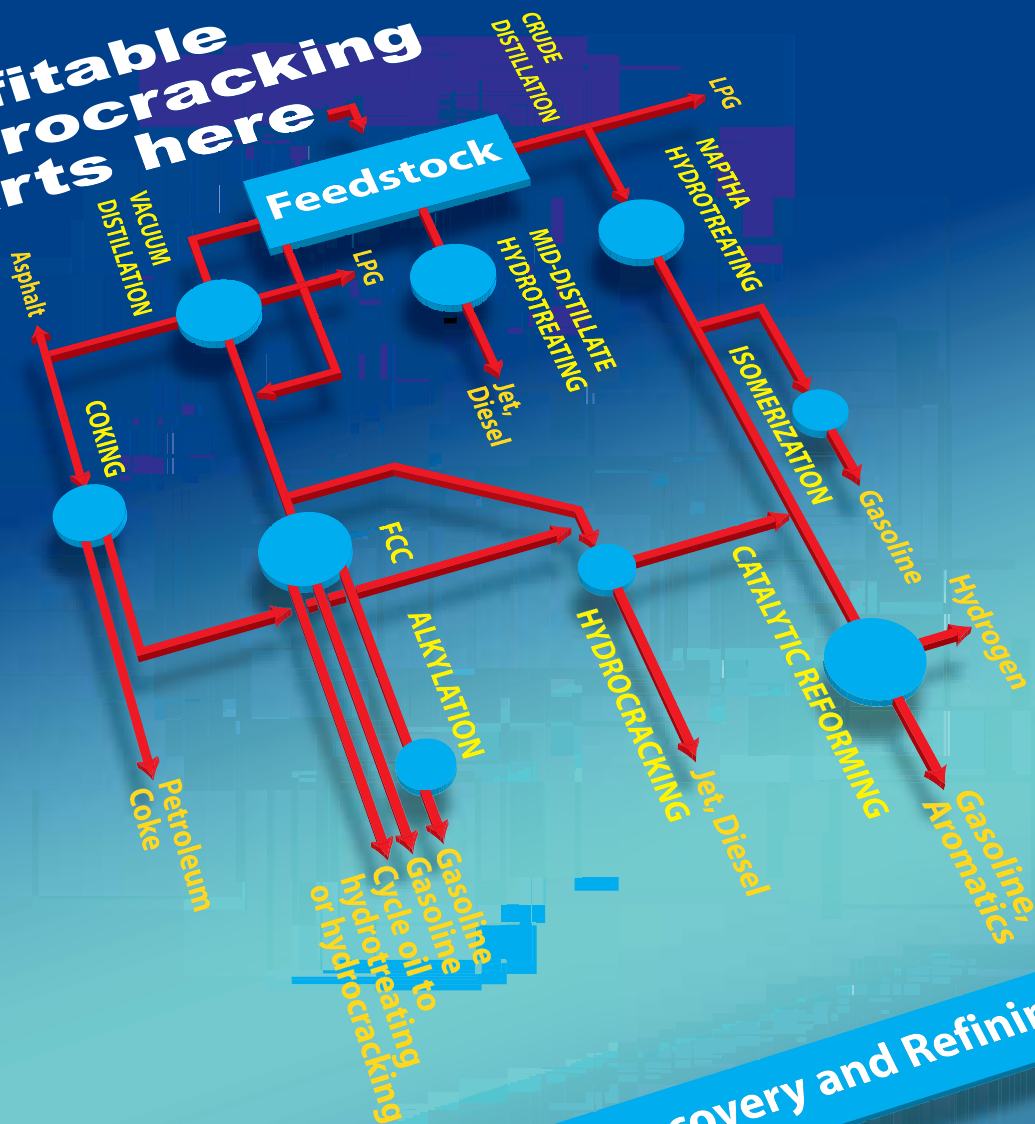
In essence, the process allows for the equivalent of eight fully loaded garbage bins to be converted into one bin of dry, sterile fuel substitute. The converter can treat materials including food, plastics, glass, rubber, paper, tins, etc.

Each cycle is complete in between 25-35 minutes depending on the moisture content of the waste. Under normal conditions, the converter container can process the garbage of a rig with a personnel on board (POB) complement of up to 250 people who would normally generate on average around 500 kg



The Garbage Converter container by MAC, currently undergoing trials at Specialist Services LLC facility in Abu Dhabi (Photo: MAC)

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of garbage per day. This particular converter container can process around 35 kg per cycle with a mixture of wet and dry garbage. Larger machines are capable of processing 500 to 1,000 kg in a single cycle and are also available from MAC.

The current containerised system produces around 15 litres of water per cycle, again depending on the initial moisture content. This can be used for irrigation, further purified for use in processes or sent directly to the sewers.

Walker revealed that during recent trials and demonstrations for prominent oil and gas companies in the UAE, the response was incredibly positive, with attendees impressed with the machine's QHSE, environmental and operational cost reduction benefits as they continuously strive to find new and innovative ways to help the environment and develop greener policies within the industry, whilst reducing costs to their own operations.

"We initially looked specifically at the oil and gas sector; however it soon became clear that garbage is a problem faced by everyone," said Walker.

"We identified the generic garbage problem with each industry specifically in the UAE and worked with this in mind. Now we have a solution for dealing with everyone's garbage. We don't expect to change the world garbage problem overnight, however by tackling it head on we hope to begin to make a difference changing people's perception of what garbage is as well as what it can be transformed into, as we make inroads towards zero landfill in the future," he added.

Two units have already entered the market, and MAC is now looking to increase its fleet this year and beyond.



**MAC sales director Andy Walker**  
(Photo: MAC)

Speaking about the garbage converter being essential and critical for offshore operations, Walker said, "The biggest task for offshore operators is to reduce costs. Utilising the Garbage Converter Container reduces waste volumes by 80 per cent, which directly impacts the transportation of that waste. The fact that the waste is now essentially a fuel and a desired commodity is an added bonus, the sale of which can be offset against either purchase or rental costs. From a QHSE perspective, the hazards that rotting waste presents are also removed, protecting personnel from bacterial infections, vermin and food poisoning, thus further reducing down time and cost. The storage of the processed RDF is easier and cleaner and clients that utilise the system don't have to worry about carrying their hazardous garbage around. It really is an economically sound proposition."

The converter container series is housed



**Dry, sterilised, inert processed garbage or RDF resembling 'fluff' is created out of the miscellaneous garbage that may include glass, food, steel and rubber, amongst other waste matter (Photo: MAC)**



“The converter system is a perfect fit with our own environmental policies and sits well in our portfolio of products and services. We are delighted to have signed a contract with MAC to supply the converter container, complimenting it with our own service and maintenance facilities.”

- MI SWACO, part of Schlumberger group of companies and one of the strategic partners working with MAC in the region

in a standard 20' ISO container and is used for treating general household, organic and infected waste. The unit's weight is around 12,000 kg and consumes power at 140 amps 3 phase 400 volts. The design concept is "plug and play", allowing very fast mobilisation, installation and maintenance of the units. It is easy to operate and is password protected.

The low maintenance converter is marketed in the UAE and Gulf region by Marine Assests Corporation DMCC, along with its strategic partners.

The units can also be customised for hazardous zone 2 areas if required.

The containers are also very scalable – a 10-foot container is available, designed specifically for use on jack-up rigs where space is at a premium.

Large converter machines can also be purchased from MAC as standalone fixed systems dealing with large quantities of waste. For a central processing facility MAC will specify, install, commission and maintain a purpose-built converter system.

"As long as garbage exists and continues to be produced, we will try to convert as much as we can into a useful commodity instead of dumping it out of sight where it damages the environment, pollutes our natural resources and heaps misery onto people less fortunate than ourselves," concluded Walker. ■

**For more information, please contact**  
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# Cutting costs, but not engagement

Chris Shennan, global leader, Korn Ferry Hay Group, argues that companies need to find a balance between the need to cut costs and the need to manage the consequences.

Last year was a brutal year for the oil and gas sector. Oil prices, which had collapsed from US\$110 to US\$58 in late 2014, not only failed to bounce back but in fact fell further still. Cutbacks in capital expenditure, manpower and assets followed accordingly. Flicking through this magazine demonstrates that tough times are set to continue.

So what are the implications for the industry and its people practices in a context where low prices may stretch to 2018? Here at Korn Ferry Hay Group, we're calling it 'cutting costs but not engagement'. Although it sounds paradoxical, this position recognises that it's only through careful balancing of the need to cut costs, with the need to manage the consequences, that will allow companies to survive.

The adjustment to new realities has been painful. But many companies need to do more. When we compare internal benchmarks to 2010, when the price was close to double its current value, we can see that a further 15 per cent may need to be cut from many budgets in order to stay profitable.

We know from previous cost-cutting rounds – 2008-09 being the best recent example – that standardised 'across the board' cuts are ineffective. They starve vital areas and can be too lenient on others. Instead, we advise that cost cutting becomes a continuous exercise, building up capability in cost management rather than partaking in a one-off cost reduction exercise.

Employee incentives are part of this cultural change, and it's up to HR departments to help shift perceptions from where employees feel that they're suffering the consequences of cost reduction, to where they feel like they're sharing in its benefits. Remember the basics – the fact is that this industry is still around 10 per cent better paid than the all-industry average. Communicating the value of compensation and benefits can go a long way.



Chris Shennan, global leader, Korn Ferry Hay Group

Knowing, as we do, that cutting costs is necessary, and also likely to negatively impact engagement, what can organisations do to survive the price recession without alienating the very people they rely on? We have identified three key areas of focus:

**Step 1** – Identify the most strategically important capabilities. You need to identify those skills that are most critical to the delivery of a differentiated service, but are

“By mapping out strategic capabilities, organisations can focus on investing in the people they really need.”

relatively scarce in the market. By mapping out strategic capabilities, organisations can focus on investing in the people they really need. This will also sharpen focus on where there may be a need to outsource capabilities that are readily accessible or add limited value, standardise and centralise

capabilities needed across the business or refocus capabilities to enhance impact.

**Step 2** – Build capabilities. Having established the most critical roles, organisations should identify the individuals and roles that act as feeder roles into these vital capabilities and focus on developing those people. By highlighting development gaps, these employees will be able to see the journey, including relevant experiences and qualifications they need to be able to move into these positions in an accelerated manner.

**Step 3** – Build the vision to keep these capabilities with you. The industry remains well paid in comparison to the general market. However, usually someone else will offer more, and in these times, we can't afford to be buying retention with large bonuses or pay rises. The best protection against such behaviour is a compelling employee proposition.

Ask yourself, do we define our approach in key areas? And do our employees believe in it? The most important areas to consider, from your employees' perspective, are:

**Quality of work:** What makes our work more challenging and/or prestigious?

**Work-life balance:** Do we recognise and cater for the differing expectations by age group, gender and skill set?

**Future growth:** What do we see as our employees' growth options and what do we do to get our people there?

**Values:** What is it about us that is distinctive and inspiring?

**Environment:** Do we provide the clarity of responsibility and necessary tools to achieve high performance?

There is no doubt that 2016 will be a challenging year. Those able to instil a cost-centric discipline across their organisation and a sharp focus on protecting the people crucial for strategic success will find themselves best able to survive these stormy conditions and, importantly, take advantage of calmer waters when they arrive. ■

# The need for a renewed focus on education and skills

Education and skills development is more important now than ever before, says  
Andy Gibbins, CEO, GLAS Consulting FZE.

**T**HE OIL, GAS and petrochemicals industry finds itself in highly turbulent times in the early months of 2016. The collapse in crude oil prices, global stock market uncertainty and the slowdown in Chinese growth have combined to give us some of the toughest times that we've faced, certainly in recent years. This has hugely impacted profitability for companies in the sector and, inevitably, budgets have been cut, particularly in those areas of discretionary expenditure such as travel, conferences and skills development.

Those of us working in the training sector certainly feel the impact of this. There is definitely less money being spent on training, delegate bookings are coming much later and there is a shift from public courses to in-house courses as companies seek the very best value for money.

Arguably, skills development in the Middle East is now perhaps more important than ever. There are ambitious localisation programmes across the GCC, with challenging quotas to be met. As the industry matures, it needs to move away from such a strong reliance on expatriate labour and achieve a sustainable and cost-effective approach, with a steady supply of highly skilled local talent. Of course, this isn't easy, especially at the outset, with all industries actively chasing the best graduates and skilled, motivated people.

With this greater emphasis on local labour, real skills development is essential, involving competency driven programmes, with measurable outcomes, using carefully selected and high quality training providers. The focus on outcomes and quality will be the keys to success.

There also has to be more involvement of functional leaders in the training and development process. It isn't enough simply to send someone on a training course and expect them to be immediately more effective in the workplace. Instead there has to be a focus on the newly acquired skills and how to use these in the workplace. This needs pre- and post-course

discussions with the line manager, together with the setting of some clear and measurable objectives related to the training, which will allow the new skills to be put to active use and the impacts actively measured. The impact of the training course should be reviewed with the employee several months after the event, to ensure that the outcomes have been achieved.

As the oil and gas industry has grown in the Middle East, so has the training industry, with a proliferation of training providers, some of which are very good indeed and some of which are, frankly, poor. Buyers need to have much more focus on exactly what it is they are buying, and focus on the credentials and experience of those actually providing the training. Good training means having good content – but this alone is not enough. If it cannot be delivered in an engaging and interesting way, the impact will be lost.

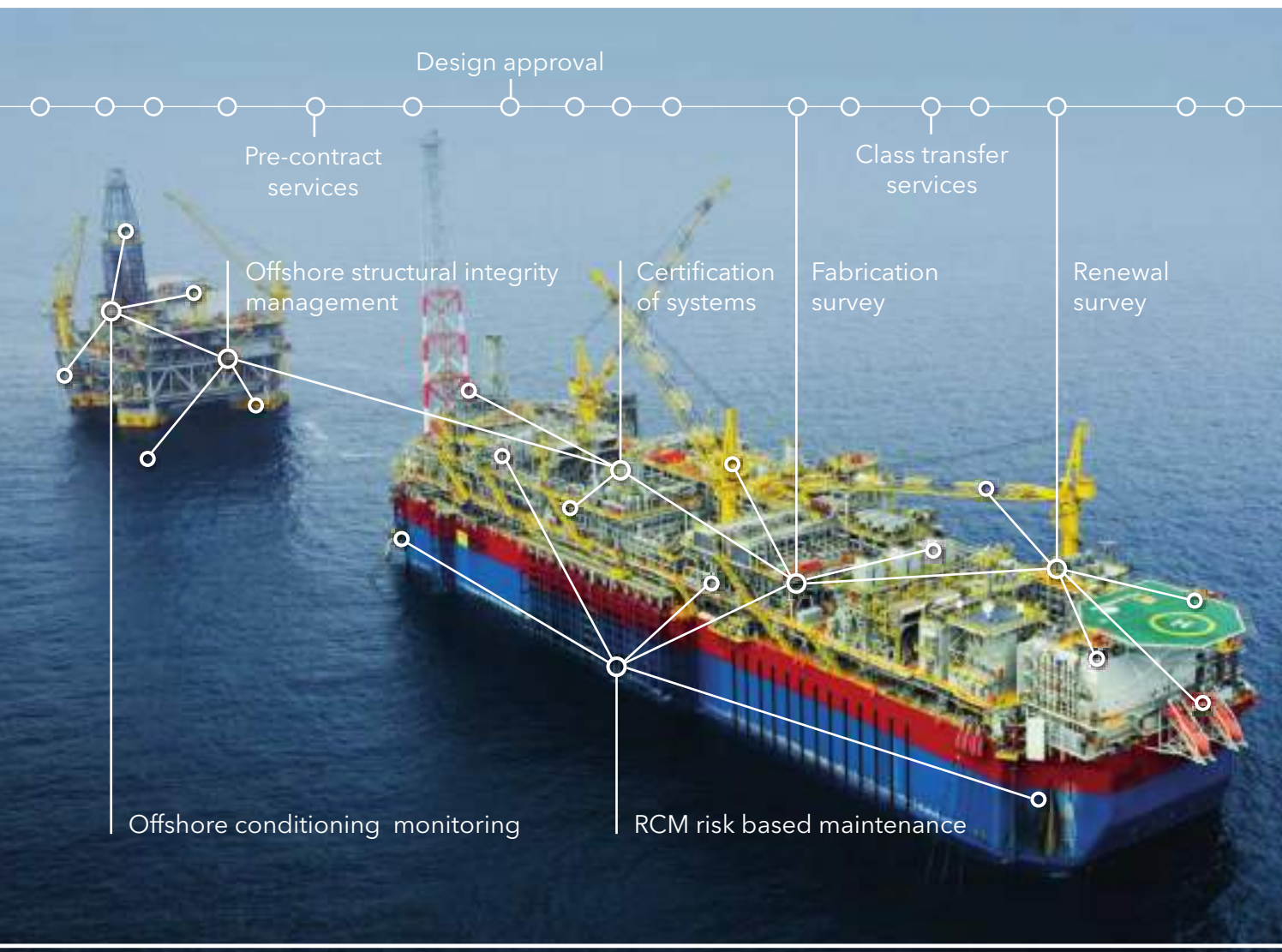
I see clear signs that the above messages are being taken on board in the region. I recently worked with a petrochemicals major, delivering a bespoke programme for shift team leaders. We had considerable discussion on the specific requirements prior to the events, including meetings at site with functional leadership and other key stakeholders, such as HR. Of course such an approach takes more time and effort (and in truth costs a little more too), but the impact is far better than it otherwise might have been. The company sent senior managers to

open the training sessions and explain exactly why they were being conducted. They also attended at the end of the event to listen to the presentations and action plans of the training delegates and to outline the related next steps.

In summary, there are a number of key points. Firstly, training and development absolutely must not stop, despite the current financial 'crisis'. Secondly, there has to be a greater focus on incorporating the training process much more into the overall development plans of staff, with much more involvement of line managers and close collaboration between them and the training department. Finally, localisation programmes must remain a priority. These are the key to future sustainable success of companies in the region. ■



**Andy Gibbins, CEO,  
GLAS Consulting FZE**



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## PDO accelerates localisation efforts with new initiatives

ONE HUNDRED AND ninety-five Omani jobseekers are being employed as welders on PDO's Rabab Harweel integrated oil and gas mega project, following their graduation to the highest international standard on its international welding programme. The recruits have successfully completed 20 months' training and are taking up positions with two of the company's main contractors, CCC and Al Turki Enterprises.

The PDO-funded vocational training scheme combines theory and practice and qualifies trainees up to 6G level – the most advanced – which is recognised by international accreditation bodies such as The Welding Institute (TWI) and the American Welding Society, enabling participants to work in the welding field in the oil and gas sector anywhere in the world. The recruits underwent their training at the RAY Skills Development's Halban workshop in Muscat, with another 200 scheduled to begin the next 6G course soon.

The 6G programme offers an enhanced financial and retention package for participants and is the first in the region to have a TWI-accredited centre outside the UK. The aim is for the programme to serve as a benchmark for the entire oil and gas sector and other industries in the Sultanate.

PDO Managing Director Raoul Restucci said, "We are immensely proud that we have been able to help these young men progress into fulfilling careers as welders, starting with our mega project at Rabab Harweel, which is of vital strategic importance to the nation."

"This is another success story for our National Objectives programme which is all about creating meaningful and rewarding training and employment opportunities for Omanis."

The programme has so far generated around 20,000 training and job opportunities



The graduates display their certificates

since 2011 in various fields covering mechanical, electrical engineering, instrumentation, the installation of scaffolding, carpentry and blacksmithing.

The 6G scheme has been supervised by PDO external affairs director Abdul-Amir Al Ajmi, whose role has recently been broadened to also lead the company's In-Country Value (ICV) programme to retain more of the oil and gas industry's wealth in Oman. As well as training and job creation, he will also oversee efforts to establish robust and sustainable local supply chains by working closely with Omani businesses including small and medium enterprises (SMEs).

He said, "I am delighted to be appointed to this expanded role and am determined to build on the great work that has already been achieved in ICV, including the successful training of so many young

Omanis as welders. Oil and gas facilities need maintenance, so the welding profession is indispensable, and it will open up broad prospects for the trainees, especially with the scarcity of qualified Omanis in the field of welding."

"We are already delivering many other significant projects and have more exciting initiatives in the planning stages, designed to secure long-term sustainable commercial benefits for the Sultanate."

PDO's efforts to create more job and training opportunities is not limited to the oil and gas industry, according to Al Ajmi. Recently the company signed a Memorandum of Understanding (MoU) with the Omani Contractors Association, by which both parties will collaborate in seeking to promote Omanisation through training and direct employment in the construction sector.

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## Petrofac CEO stresses the need for continuing investment in human capital

CONTINUING INVESTMENT IN human capital is essential for the future resilience of the oil and gas industry and should not be regarded as an area of discretionary spend that can be cut, said Ayman Asfari, CEO of Petrofac, in a presentation at IP Week in London on 9 February.

Asfari commented that with swingeing job cuts and the retirement of mature and experienced skilled workers, the industry is losing valuable skills at a time when project complexity is increasing.

"In this oil price environment we must try to operate and deliver projects more efficiently, and look for innovative engineering solutions to enable this," he said. "Costs are being squeezed and project execution has to be flawless, so the need is even higher to retain the best talent to deliver projects to the highest standards. It's more important than ever to do this at 30 dollar oil, because margins of error are thinner. Unfortunately what we're seeing right now is that investment in training and development is the first thing to be sacrificed.

"We must continually monitor and assess the capability and competence we have, making sure that the right tools are in place to do so and

taking action to address gaps and inefficiencies," he went on. "Given the job cuts made in the current environment it is essential we know where our strengths and weaknesses lie.

"Without this knowledge we will be making poor investment decisions in training and development, and we cannot afford that at this time.

"We need to continue to invest in training and development, and ensure that this prepares our people for the challenges they will be facing today. We need to build training programmes that nurture talent and are geared to 'Generation Y', offering them professionally and personally rewarding experiences and careers, mixing e-learning, social networking for interaction with peers, and greater access to communication with top management," he continued.

At Petrofac's academy for graduates, entrants for its engineering project management and technical training programmes are supported by experts and mentors throughout their careers with the company. Petrofac hires up to 400 new graduates a year, mainly from the countries in which it operates, one third of these being

female. Asfari stressed the importance of showing these young graduates that there is a long term career for them in the business. "If they see they may be let go after a while, they will not be attracted to the industry."

Asfari also highlighted the importance of training in technical trades where competence of operators is critical. Petrofac, which has around 70 training centres throughout the world where it provides training for its clients, has developed integrated training programmes where participants get training and experience in operating plants and dealing with every form of disaster. "In Malaysia for example we have upgraded Petronas's INSTEP facility for training all its upstream operations personnel, and are managing it on their behalf. The value creation of such programmes is very large," he noted.

"Finally we need to capture the knowledge and experience of the generation that is about to retire," he said.

"In spite of the challenges it is important not to lose focus on development and skills and the resilience of the resource pool," Asfari concluded. "Our people drive up performance, and that requires continuous investment."

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7–10 March 2016 • Manama, Bahrain

**AAPG/EAGE/SEG/SPE THE KNOWLEDGE MANAGEMENT CHALLENGE**  
23–24 March 2016 • Abu Dhabi, UAE

**AAPG/SEG INTERNATIONAL CONFERENCE AND EXHIBITION (ICE)**  
3–6 April 2016 • Barcelona, Spain

**EXPLORING MATURE BASINS**  
11–13 April 2016 • Manama, Bahrain

**SPE/AAPG E&P DATA MANAGEMENT & ANALYTICS: ENABLING CAPITAL EFFICIENCY**  
9–11 May 2016 • Muscat, Oman

**AAPG/SEG ADVANCES IN SUBSURFACE IMAGING & MAPPING**  
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**AAPG/SEG INTERNATIONAL CONFERENCE AND EXHIBITION (ICE)**  
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# Keeping compressor emissions under control

The correct selection and maintenance of grid-scale natural gas compressors – both positive displacement and centrifugal types – can reduce losses of methane and VOCs.

**A**S USE OF natural gas soars in the USA, the Environmental Protection Agency (EPA) has launched a research project into ways of cutting the level of emissions from the large compressors used to process, transmit and store this key commodity. Effort has been focused on methane and volatile organic compounds, and an exploratory White Paper (discussion document) was launched for peer review two years ago\*.

Local developments like the GCC's undersea Dolphin scheme have focused attention on powering the expanding gas industry in



*Increasing attention is being directed to reducing emissions from compressors (Photo: Budimir Jevtic / Shutterstock)*

a responsible way in the Middle East, too, so there is much to be learned about emissions mitigation from current research into the problem in the West.

The main strength of this work-in-progress document is that it explains the technologies of large-scale compressor operation – both reciprocating and centrifugal types, irrespective of the source of power – for the benefit of utility operators who are not transmission specialists. This is done in the form of straightforward process

“Local developments have focused attention on powering the expanding gas industry in a responsible way in the Middle East”

descriptions accompanied by generic diagrams. These explain most of the terms and sub-components used in the gas industry. All US emissions figures for the different processes are presented for one recent year, reciprocating (positive displacement) equipment being the type of compressor most widely used at all stages. Readers should note that the interpretation of these figures in a fast-growing market is not straightforward.

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Reciprocating compressors are of the crankshaft/piston type and are particularly subject to physical wear and tear in use, says the EPA. This is due to deterioration of the packing materials surrounding the mechanical components such as the connecting rods which transmit drive from the prime mover. This assembly consists of a series of flexible rings sitting in machined metal cups that surround the piston driver and form an effective gas seal.

Over time, these individual rings inevitably become worn, leading to emissions of processed gas from the nose gasket, from between the cups themselves, and from between the individual rings and the drive shaft. These unwanted emissions are normally vented and lost to the atmosphere.

In the case of centrifugal compressors which rely on rotating impellers for the pressure energy they impart, the emissions arise from gas penetration of the series of seals, usually installed as a pair or more and of wet or dry type, rather than leakage arising from wear between rings which are designed not to touch (and therefore degrade) anyway.

The dry (non-oiled) type of seals are usually preferred by utilities because they are mechanically simpler to manufacture and install, require less power to operate, are more reliable according to some users, and are generally easier to shut down and maintain on a rolling basis.

With the reciprocating types in frequent use in the USA, emissions can be controlled by periodic replacement of the connecting rod packing systems. New technologies are now being used to capture these and recirculate them for environmental

“Dry-sealed centrifugal machines require less maintenance”

benefits that boost the bottom line at the same time.

When employing continuous-process centrifugal compressors, emissions can be effectively reduced by using dry seals instead of the wet type which use oil to collect gas as it circulates (“off-gassing”).

Dry-sealed centrifugal machines require less maintenance, create lower emissions and are generally more energy efficient in use; the costs of the two sealing technologies for impeller-based machines are broadly similar, the report notes.

Operators are reminded that when wet-seal centrifugal compressors are in use it may be feasible to capture emissions from the seal oil itself and route the recovered methane back to the compressor or to another process – or exploit it economically. Again, this cuts transmission costs and benefits the environment too.

The EPA discussion document sums up the accumulated data as collected by the Agency on vented VOC and methane emissions from both types of large-scale compressor currently in use for gas handling, and how to effectively mitigate these in a fast-growing production environment. In 2012, annual unwanted emissions of methane from combined gas production, processing and transport in the USA amounted to nearly 16 mn Mscf/yr, more than half from the use of reciprocating plant that pressurises the gas for pipeline and other forms of delivery alone.

In summary, it notes that these always-on pressurisers are found throughout the natural gas industry’s infrastructure right across North America, the centrifugal types being predominantly used in the processing and transmission/storage segments which form the greater part of the business. ■

*\*Oil & Natural Gas Sector Compressors – Report for Review Panel, Office of Air Quality Planning & Standards, April 2014  
http://www3.epa.gov.*



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# A new solution for flow control

Charles Cruickshank, CEO LUX Assure, discusses the benefits of OMMICA™, an emerging solution for hydrate inhibitor testing.

**S**INCE THE BEGINNING of offshore production, the oil and gas industry has been faced with one common flow assurance challenge – the formation of gas hydrates.

Gas hydrates are crystalline, cage-like structures which can block pipelines if not effectively monitored. Remediation is often costly and potentially dangerous, posing a large risk to offshore projects. As the oil and gas market continues to grow in the Middle East, it is essential that operators implement a prevention or management strategy.

Monoethylene glycol (MEG) and methanol are used as thermodynamic hydrate inhibitors to prevent the formation of gas hydrates in oil and gas pipelines. MEG is usually injected continually into pipeline fluids, while methanol is batch-dosed, with MEG being recovered in regeneration and reclamation units.

The presence of methanol and MEG in hydrocarbon fluids reduces the quality and value of produced fluids. Both methanol and MEG are used upstream for gas hydrate control but can cause problems downstream during processing and refining, such as separation difficulties, poisoning catalysts, poisoning molecular sieve beds and causing upsets in waste water treatment systems.

As a consequence, refineries and terminals often impose limits on the acceptable level of hydrate inhibitor, and exceeding these can incur huge fines for operators.

## Reasons to monitor

Methanol is used in many offshore applications for the oil and gas industry, including hydrate inhibition during well start-up, displacement of trees and well tubing for hydrate inhibition during shutdown operations, and in equalising differential pressure across subsea valves.

Refineries need to know exactly how much methanol operators are exporting so they can be invoiced accurately and avoid dispute. Operators, in turn, need to know how much methanol they are exporting and



*Charles Cruickshank, CEO Lux Assure*

how much is coming from any tie-backs. As methanol is commonly used during start-up procedures, operators are often faced with the decision to either, defer start-up and lose production revenues, or start-up and risk a charge.

“Refineries and terminals often impose limits on the acceptable level of hydrate inhibitor”

MEG is less of a problem downstream than methanol as losses to gas phase are negligible, and solubility in the hydrocarbon phase is lower than methanol. However, limits are still imposed on acceptable MEG concentrations in produced fluids and must be monitored at various stages during the regeneration and reclamation process. The presence of high levels of MEG can affect oil-in-water measurements and operators must also ensure that overboard water isn't contaminated.

Apart from financial implications, monitoring the concentration of methanol and MEG in produced water can also be vital to ensure compliance with environmental regulations. Methanol does readily biodegrade but it is a toxic substance.

Many offshore oil production facilities treat and dispose of produced water overboard, which makes methanol a high-volume discharge of production-treating chemicals. It is therefore necessary for every asset to closely monitor and manage the environmental effects of methanol discharge.

## Traditional monitoring method

Gas chromatography (GC) is the traditional method for monitoring methanol and MEG in produced fluids, but this technique can have a number of drawbacks, including cost, time and maintenance issues, especially when instruments are used offshore. Gas chromatographs are sensitive pieces of equipment and can also be complex to run and require experienced personnel to operate them.

Time is one of the biggest obstacles when using GC, as preparing samples for analysis often involves a water extraction step where the inhibitor is transferred from the oil phase into the aqueous phase, which can be time-consuming and subject to user variation. GC samples often need to be shipped onshore, causing a delay in results as well as added uncertainty in the results, as samples can change over time.

That's why LUX Assure developed OMMICA™, a testing kit allowing operators to analyse hydrate inhibitors such as methanol and MEG on-site so they can respond more promptly to the information, particularly in offshore situations.

## How it works

OMMICA™ monitors methanol and MEG concentrations in produced fluids, such as water, crude oil and condensate. With many advantages over traditional GC techniques, including simplicity and the use of robust

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equipment, it is suitable for offshore use.

The technology uses reagents that react only with the chemical it is designed to assess – whether that's methanol or MEG. This means that other chemicals don't interfere, giving accurate and timely results.

The technology provides simple set-up and user independence, meaning it can be used on-site in offshore operations by existing personnel. With a turnaround time of as little as one hour, the technology can deliver vital information to provide financial as well as HSE benefits to operators.

OMMICA™ has had successful field trials and has proven its worth in offshore operations. In trials conducted on pipelines in the North Sea, OMMICA™ kits have been used to determine both methanol and MEG concentrations in produced fluids.

## Case Study 1 – Methanol analysis, North Sea

Methanol is used upstream for gas hydrate control, but can cause major problems downstream during processing and refining. An oil platform in the North Sea undertook a pigging programme for the dewatering of a pipeline. As the concentration of methanol in the water slug produced from pigging is uncertain, analysis was required to inform the terminal of the levels it was likely to receive.

A pre-operation lab test was carried out to compare OMMICA™ analysis with the conventional gas chromatography (GC) method. Results compared well. During the pigging programme, oil and water samples were tested offshore using OMMICA™ kits, and by GC in an onshore lab. Both sets of analysis were carried out by the operator or its service company.



“OMMICA™ has had successful field trials and has proven its worth in offshore operations”

Data gathered offshore using OMMICA™ was in line with expectations and previous GC analysis, for both oil and water samples.

Data was reported daily from the offshore location throughout dewatering, so the operator could inform the terminal of the methanol concentrations present in the fluid it would receive. Using only the GC method, results would not have been available until days later.

## Case study 2 – MEG analysis, Norway

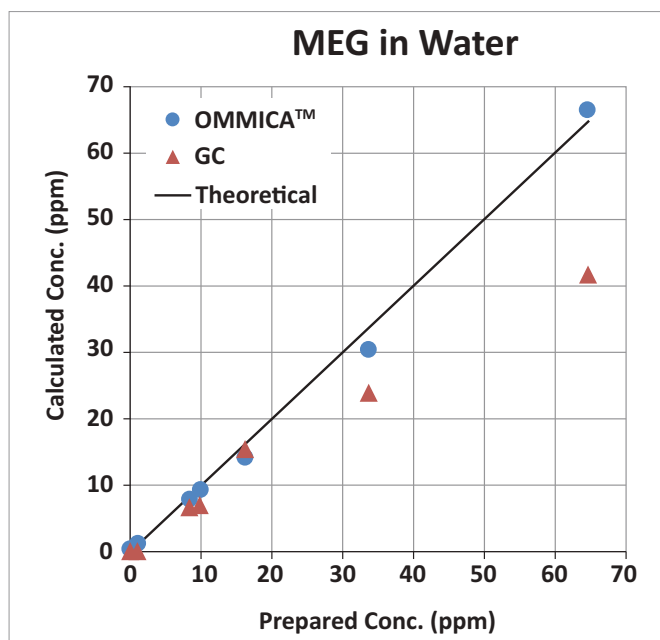
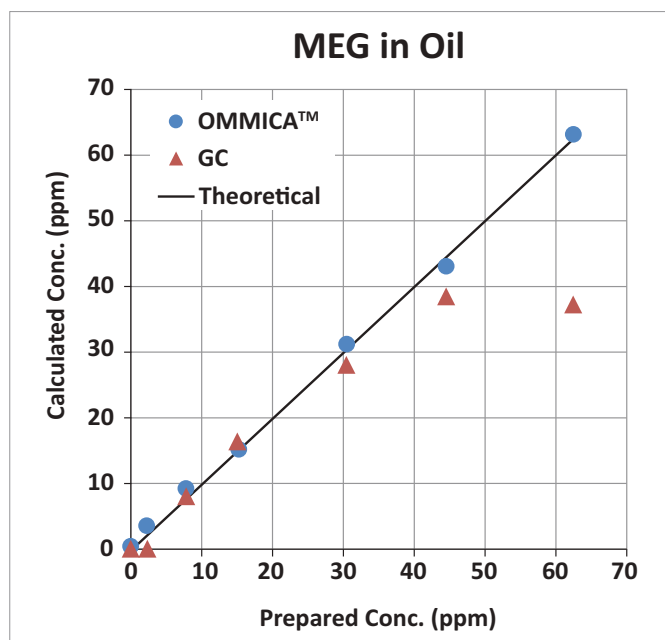
The use of MEG is especially applicable to long-distance gas-condensate tie-backs, where heating or insulating the pipelines is

impractical or uneconomical. Analysing the MEG concentration in fluids from various points in a MEG regeneration system gives vital information on how effectively the plant is running, and whether or not any discharged water meets environmental limits.

Typical analysis for MEG concentration is by gas chromatography (GC), which is normally only available in an onshore lab staffed by specialist experts. OMMICA™ can analyse samples offshore, or onshore, easily and quickly. It can be used by personnel with very basic training or technical experience.

The OMMICA™ MEG in Water kit was used by an oil and gas operator with a MEG regeneration facility. Samples were also analysed by GC for comparison. Correlation was excellent, with OMMICA™ delivering immediate results from a quick and simple process.

The OMMICA™ MEG in Water kit delivered accurate analysis onsite, offshore, in a very short time frame, whereas the traditional GC analysis took significantly longer to deliver similar results. ■



## HIMOINSA gears up for product launches at MEE 2016

HIMOINSA'S RANGE OF diesel generators for the rental market has been bolstered by the HIMOINSA models HRGP 25 T5 LPG, HRGP 40 T5 LPG and HRGP 60 T5 LPG.

The new gas-powered generators feature integrated LPG tanks offering 25, 40 and 60 kVA of continuous power. The new rental canopy version incorporates enough LPG storage for 24 hours of

continuous operation without refuelling.

The features of the generators, which can be connected to an external tank to extend their autonomous operation for as long as desired, will be presented at MEE 2016, to be held from 1-3 March in Dubai, with the HRGP60 T5 LPG model on the company's stand in Sheikh Saeed Hall 3.

HIMOINSA has also launched the new HMW-1270, a soundproofed generator set fitted in a 20-foot container. The new unit provides more power in less space, as until now generators of this power with an MTU engine could only be assembled in 40-foot containers due to the size of the engines.

The HMW-1270 has been designed to provide an outstanding performance in extreme temperature conditions and has an integrated 1250-litre fuel tank and will be exhibited for the



**HIMOINSA's HYW 35 T5 model comes with a 1,000-hour service interval**



**The HRGP60 T5 LPG generator from HIMOINSA will be on the company's stand during MEE 2016**

first time at MEE 2016.

Attendees to this year's exhibition will also have the opportunity to learn about the company's new HYW 35 T5 model, which comes with a 1,000-hour service interval. The generator sets from the Industrial Range feature Yanmar engines (8-45 kVA) and can incorporate a fuel tank of 1,000L, which is 10 times larger than what it is offered as standard and translates into fewer trips to the site for refuelling operations.

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*GAC has been a leader in shipping, marine and logistics services in the Middle East for nearly 60 years*



# Preparing for business to **take off again**

The strength of its Middle East business and its new global strategy is standing shipping and logistics giant GAC in good stead in the downturn. *Oil Review* spoke to William Hill, GAC's executive group vice president – Oil & Gas.

**G**AC's oil and gas business continues to do well in the Middle East as the operators are maintaining production, says Hill. "Where rigs have been stacked, we've managed to capture that business as well, particularly in Bahrain," he adds. "Because of our reputation in the Middle East, we're finding that we're picking up more business as things get more complicated."

Dubai-based GAC has been a leader in the provision of shipping, logistics and marine services in the Middle East for nearly 60 years. Oil and gas are a strong focus for

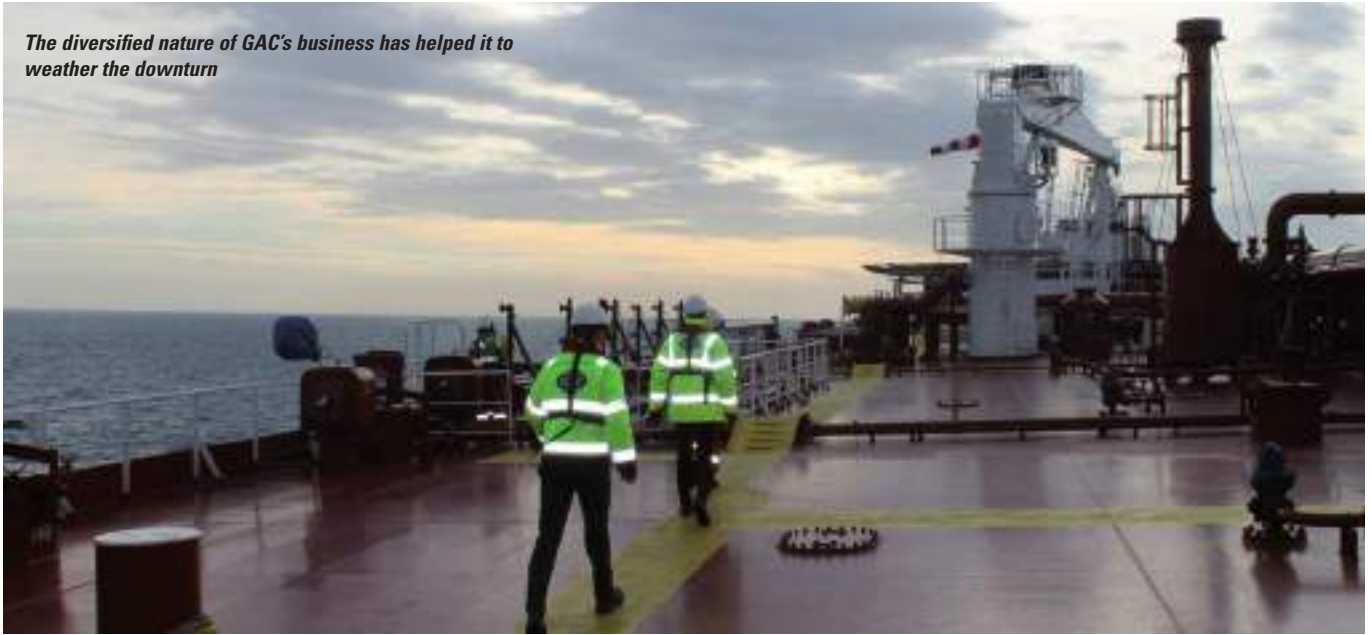
the company, whose clients include a number of big upstream operators as well as smaller suppliers. GAC provides dedicated support all the way from exploration through to oilfield development,

“ Our main focus is to grow our business with our twenty key customers worldwide.”

using its core competencies in supply chain, offshore and agency services complemented by its integrated shipping, logistics and marine solutions.

"We are involved in all aspects of transportation in relation to oil and gas, offshore and onshore," says Hill. "Here in the Middle East we run supply yards in Qatar and UAE, and are looking at setting up one in Eastern Province, Saudi Arabia; we also have a marine business based in Abu Dhabi. We're big in freight forwarding and ship agency services, which have been doing very well."

**The diversified nature of GAC's business has helped it to weather the downturn**



The diversified nature of the company's business has also helped it to weather the downturn, he comments. "For example, within our logistics division we have automotive and FMCG businesses, so we're not wholly reliant on oil and gas."

Hill's appointment as GAC's executive group vice president – Oil & Gas in May 2015 marks a strengthening of the company's focus on the worldwide energy sector, in line with its new global business strategy. He has been with GAC for around 30 years working across many different sectors, so can bring different ways of thinking and processes to the oil and gas sector.

"GAC has operations in Europe, the Americas, Asia, the Middle East and Africa," explains Hill. "Until mid-2015, each region pursued its own strategy. Now we are putting everything under one umbrella with a strategy we hope will take us through to 2020, pooling all of our information on customers, service levels and training. This new strategy, which is a form of good housekeeping, just so happens to coincide with the downturn."

### Greater focus

"What it does is it gives us a greater focus on this industry, the companies we're dealing with, and how our staff are working within the industry. We are also streamlining our services within this sector. Our main focus is to grow our business with our twenty key customers worldwide, many of whom are in the Middle East, rather than chase new business. Our customers are very receptive to this approach because we are looking at their business almost from a consultancy point of view, rather than pitching for business. The good thing about

doing this at this time is that a lot of companies are retendering their business with the aim of reducing costs, so we are well placed to bid for this while adopting a slightly different approach.

"So it is quite an exciting time for us; in fact we've started to recruit additional resources to cater for what we are confident will be the new business coming in and to bring in some different skills, not just in the Middle East but also Asia and Europe. While there is a global approach to this new strategy, the fact that the Middle East, our core market, is so buoyant for us in terms of oil and gas, stands us in good stead for pitching for business elsewhere."

**“As a result of their training, our front-line staff can do the work much more efficiently.”**

The company has built up a tremendous infrastructure and operation in the Middle East in its 60 years present in the region, adds Hill, which it can build on to pursue opportunities elsewhere.

"For example many companies will use our freight forwarding services in the Middle East but will use a different freight forwarder say in the USA. Now we are in a good position to offer the whole package."

GAC's strong focus on training is paying off in the downturn, as Hill explains.

"We have a two-tier oil and gas training programme, involving general oil and gas training, which is mandatory for all, and front-line training for our operational staff

who deal with our clients, focusing on operational excellence specific to oil and gas. When the downturn came, a number of clients downsized the number of personnel they employed, relying on us to do more of the work.

"As a result of their training, our front-line staff can do the work much more efficiently, so customers are able to lean on us without us incurring additional costs, as part of the service. We started this training a year ago so when the downturn came we were prepared for it – it was good timing!

"Because of our new strategy, when the upturn comes we should be in a good position to cater for it," Hill concludes. "We're recruiting, building up our resources and training key personnel now to be ahead of the competition when business takes off again." ■



**William Hill,**  
executive  
group vice  
president  
Oil & Gas,  
GAC

# Increasing output at Oman's Sohar Refinery

With natural gas prices falling alongside the oil price slump, EPC firm Black & Veatch is helping to enhance production with its gas treating technology.



*ORPIC currently provides 100 per cent of the Sultanate's fuel needs (Photo: ORPIC)*

**O**MAN REFINERIES AND Petrochemicals Company LLC (ORPIC) contracted Black & Veatch for help in processing increasingly heavy crude and sour crudes to meet rising petroleum product demand in the region. Black & Veatch is a current technology provider for ORPIC in the sulphur recovery unit (SRU) and tail gas treating unit (TGTU) as part of the Sohar Refinery Expansion project currently under construction. This project will increase the processing capacity and flexibility of the existing refinery to meet additional demand.

Sulphur recovery refers to the treatment of sulphur-bearing off-gases from oil refining and gas processing. These off-gases, known commonly as acid gases, generally contain sulphur in the form of hydrogen sulphide ( $H_2S$ ). The  $H_2S$  is typically recovered as elemental sulphur using the modified Claus process within an SRU.

Black & Veatch provided a basic engineering design package, as well as detailed design consulting services including review of major equipment, HAZOP participation, operator training and start-up after unit construction, which is expected in 2016. The design also features Black & Veatch's patented MAG™ degassing process.

Tail gas treating refers to the processing of unconverted sulphur-bearing gases downstream of an SRU. The majority of the sulphur recovery occurs in the SRU, but to achieve higher levels of overall recovery, often to abide by local air emission regulations, the remaining sulphur in the tail gas from the SRU must be treated. There are a number of tail gas treating technologies that may be deployed in order to fulfil this objective.

In addition, the elemental sulphur is recovered in molten form and often requires 'degassing' of the residual  $H_2S$  present in the sulphur product in order to meet product specification.

Talking about the current challenges, Tom Christensen, director, Black & Veatch Middle East, said that they appear to centre around uncertainty with low oil prices. Wherever an owner is exposed to price volatility on the upstream side of the business, much of the focus seems to shift towards driving efficiency and maximising run time in existing units as opposed to larger capital projects.

More downward pressure on oil prices is expected from the introduction of Iranian crude into the global market. This may introduce further economic challenges for OPEC members, and regional economic

instability may provide continued pressure for a consensus cut in global production.

Black & Veatch provided a process design package for two identical parallel SRU trains processing both amine acid gas and sour water stripper acid gas. Each SRU was designed to handle the full complement of ammonia-bearing sour water stripper gas in order to segregate acid gas feedstock for streamlining operations. A common TGTU for both SRU trains was chosen to reduce overall capital expenditure. The common TGTU utilised generic methyl diethanol amine (MDEA) to achieve an overall sulphur recovery efficiency of 99.9 per cent.

The process design package for ORPIC was completed in 2012 and was included as part of the Sohar Refinery improvement project's EPC package. Along with increased fuels production, the expansion will increase polypropylene production.

Overall, the refinery expansion will increase production capability by roughly 60,000 bpd above the existing 116,000 bpd capacity.

Black & Veatch is a licensor of modified Claus technology, sub dewpoint cold bed adsorption (CBA) technology, and amine-based tail gas treating technology. ■

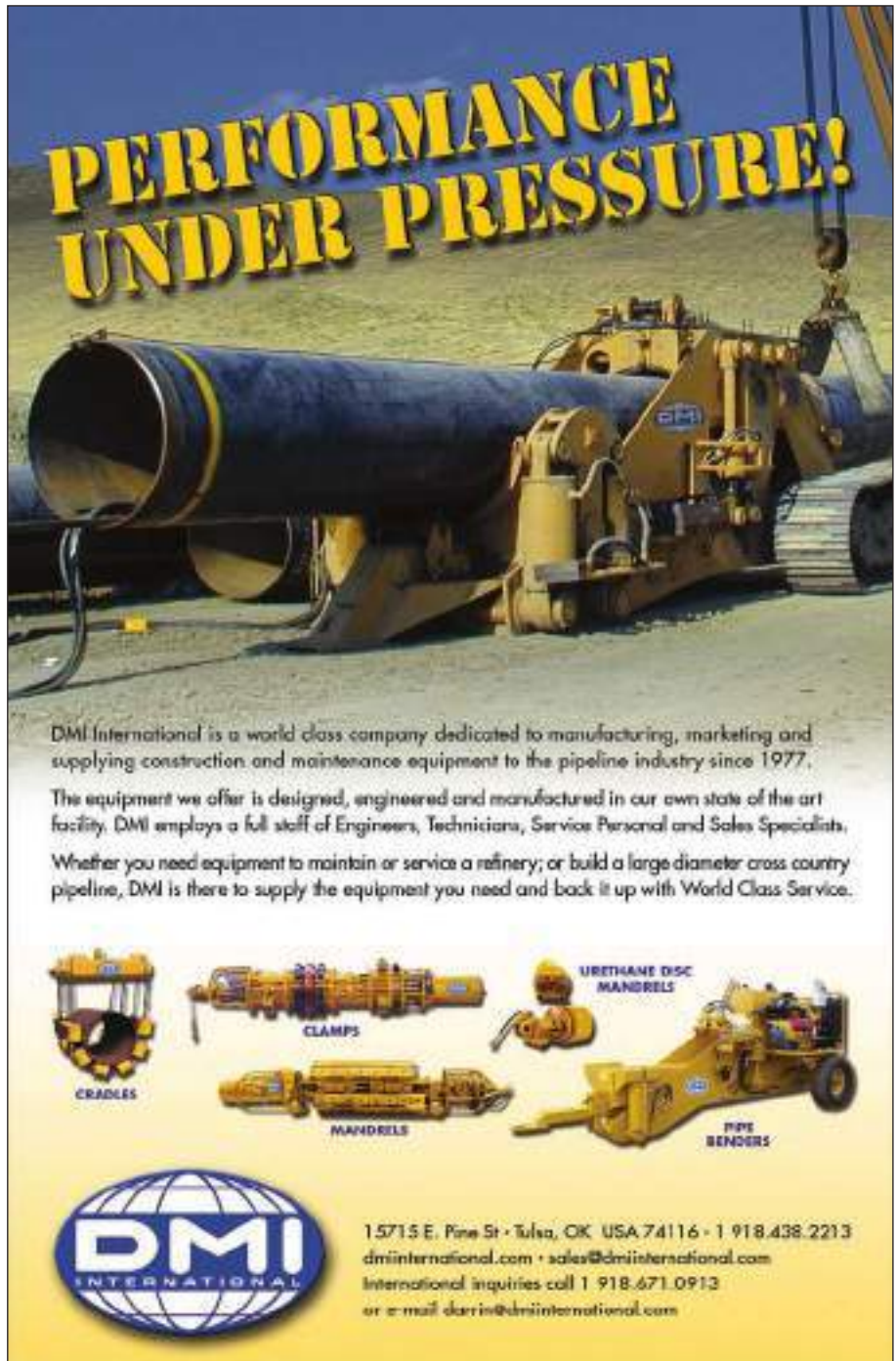
# The benefits of ever-growing seismic data volumes

With the 30-fold increase in seismic data volumes recorded on the average Arabian peninsula field crew over the last ten years, Roger May, VP, Middle East Geomarket, CGG, discusses whether this trend will continue in the next ten years, given today's changed business environment.

**F**ROM A GEOPHYSICAL perspective, the industry drive for ever increasing data volumes and, in turn, increasing data density, makes sense. Whilst there have been numerous attempts to define 'how much is enough' in terms of data volumes, most operators who have tried to answer this question have found that data quality just continues to improve with density and that, as an industry, we have yet to hit the limit. The question to pose is still 'What level of quality is enough for my objectives given my budget?', rather than 'How can I create the best quality possible?'

“The question to pose is still 'What level of quality is enough for my objectives given my budget' rather than 'How can I create the best quality possible?'”

Interestingly, the increase in data volumes can be rather misleading. The advent of single-sensor recording systems can give rise to crews that have many channels, but, in fact, the number of actual measurements taken on these crews is not



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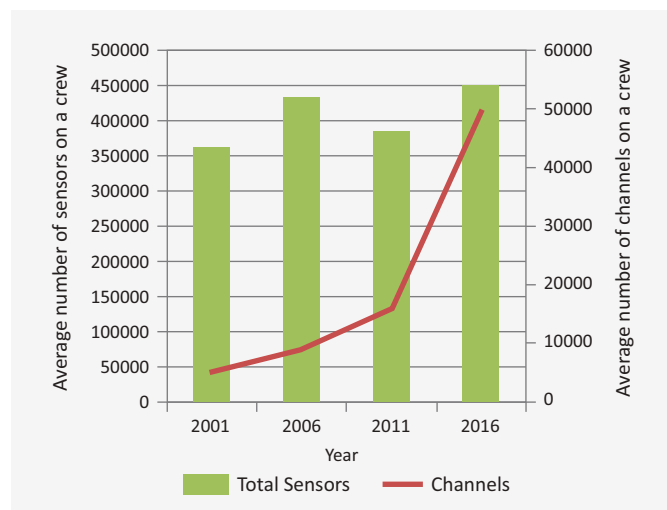
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**Figure 1.** Graphs showing the configuration of the average crew deployed in Arabia in the recent past. Whilst channel counts have grown dramatically, the number of sensors has not; this is because fewer sensors are typically being deployed for each channel. From a data management perspective, data measurements are being summed in a different place in the workflow, in the data processing, rather than in the field recording. For sources, the growth in productivity has led to significantly more data being acquired, even if one considers that single vibrators are now recorded rather than groups of recording. The adoption of these techniques is currently irregular throughout the industry, leaving significant scope for productivity gains for many operators.



#### Average Middle East crew configurations :

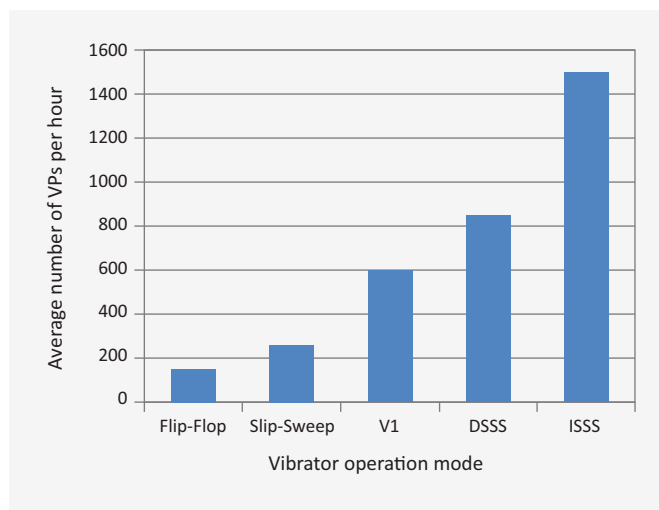
Whilst channel count has been increasing dramatically, with less sensors per channel, the number of physical measurements has remained fairly constant.

*Graphs courtesy of Sercel*

necessarily higher than in array-based systems. Looked at in data management terms, some would view that the data measurements on the receiver side have stayed relatively constant (see left-hand graph in Figure 1), but the point at which this data is summed in the overall workflow that delivers the geophysicist a manageable dataset has been changed. For some, the positioning of this data bottleneck has become a defining factor in the management of the complete workflow, and in their selection of technology: single-sensor versus array.

“These increases in source productivity can be in the order of a factor of ten, but the facilitation factor for getting access to this uplift is integration with data processing.”

Other than increasing the numbers of channels on a crew, the other technological breakthrough that has increased data volumes since 2006 was the advent of continuous recording. Old recorders used to switch on when a shot fired (or swept in the case of vibrators), and switched off when the listen time was complete. In continuous recording, the instrument is essentially switched on 24 hours a day, for the duration of a survey, and as shots are acquired, software extracts them from the continuous data stream as required; this process is known as ‘combing’. This then facilitated the concept of super-spreads, where the sensors were deployed over a wide area and numerous sources were acquired in the super-spread, with combing effectively becoming both a function of time, and now source location. In simple terms, this was like shooting multiple surveys at once, with the vibrators positioned at distances such that these ‘multiple’ surveys did not overlap. Since 2006, operators have steadily been bringing these multiple surveys ever closer together, for an ever increasing gain in source productivity, and have been



#### Vibrator operation mode:

The type of mode of vibrator operation has the potential to have a much bigger impact on the number of physical measurements taken. DSSS and ISSS are trademarks of BP.

utilising more vibrators on a crew.

These increases in source productivity can be in the order of a factor of ten (right-hand graph in Figure 1), but the facilitation factor for getting access to this uplift is integration with data processing. As vibrators are moved closer together, ‘seismic interference’ is recorded between sources. This interference needs to be eliminated in data processing, a step termed ‘deblending’.

#### Likely uplifts

It is in this area where the most likely uplifts in productivity in the Arabian peninsula will come in the next ten years, because whilst ever increasing sensor counts yield productivity gains linearly with the cost of a crew, blended source acquisition schemes give productivity gains by utilising existing sensor counts more effectively through the use of more vibrators, of which there are a great number available for operators to choose from. The constraining factor on operators achieving these productivity gains is likely to be the extent to which they can visualise the overall integrated workflow that creates a geophysicist’s end-product. For organisations that are grouped separately into Acquisition, Data Processing and Interpretation, it can be difficult to gain acceptance that what one can do in processing could have a direct knock-on effect on the nature of the acquisition operation. Many very senior staff within our industry will remember their first jobs as field QCs on the land crews of the past, where their job was to look at each shot and reject it if it was too noisy. Now, the science is telling us not to worry about the noise, we can deal with that in processing, whilst the increased number of sources we can acquire will give us an overall better product.

Operators who can overcome this natural inertia will find that they can continue the data density growth, with all its corresponding benefits of an end seismic product that has an ever improving representation of the reservoir, whilst the costs will fit around the new market dynamics of the low oil price and lower exploration expenditure that may be with us for some years to come. ■



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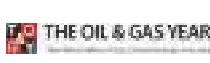
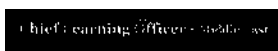
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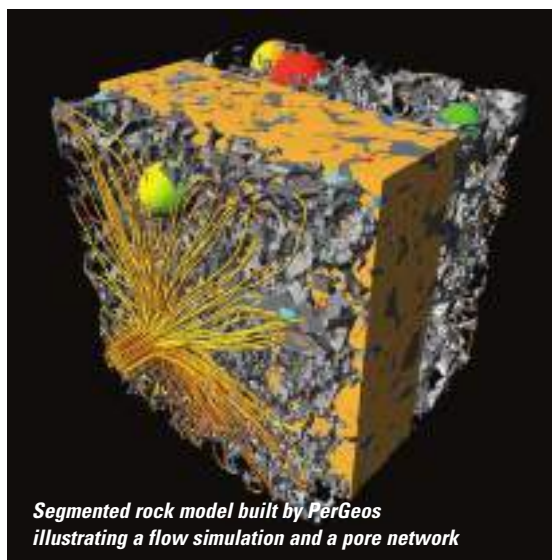
[www.oilandgasbigdata.com](http://www.oilandgasbigdata.com)

## FEI launches PerGeos digital rock software

FEI HAS RELEASED PerGeos™, a comprehensive digital rock software that helps geoscientists rapidly interpret and model digital rock imagery so that exploration and production (E&P) engineers can obtain meaningful, actionable data quickly and easily.

PerGeos provides a better understanding of formation features and physical property of reservoir rock. Multi-scale, microscopic imagery and advanced digital rock modeling provides the only direct measurement for analysing critical structural characteristics and physical properties, such as grain size, pore space and connectivity, sayt the company. Using PerGeos, core analysts, geologists and petrophysicists can integrate data from multiple sources and share descriptions and statistics using a common platform. It features automated workflows, high-powered image processing algorithms and a user-friendly interface.

"Oil companies work with and analyse a bewildering array of image data types and formats when trying to understand the physical characteristics of reservoir rock, how those characteristics relate to the potential value of a reservoir, and relate those observations to the production techniques required to optimise that value," said Mark Bashforth, general manager of FEI's Oil and Gas



*Segmented rock model built by PerGeos illustrating a flow simulation and a pore network*

business. "This information can now be managed digitally through PerGeos, via a collaborative workspace to create and share a common rock model much faster than using traditional core analysis methods."

Bashforth adds, "This is very important for reservoir engineers awaiting these critical inputs, such as capillary pressure, porosity and permeability, for their geomodels; knowledge of these properties helps asset managers visualise and understand the ultimate potential recovery of a reservoir, thereby improving their estimates of reserves and overall production-related CapEx investments."

The initial PerGeos release consists of three modules: petrophysics, pore statistics and core profile. Each module is designed to help users make

statistical observations about the sample as it relates to their specific function, and then allows them to transfer this knowledge to a digital environment for interactive assessment by the entire asset team.

This is a unique feature that provides cross-discipline collaboration, and enables all users to gain a common understanding of how the rock models are created – an important aspect in validating and understanding the contributors to reservoir viability and producibility.

## The KELLER M5 pressure sensor sets new standards

KELLER AG FÜR Druckmesstechnik has launched its M5 series of pressure sensors for static and highly dynamic pressure measurements up to 50 kHz. The new sensor sets new standards in temperature range, measurement accuracy, installation size and signal conditioning, according to the company.

The key to measuring highly dynamic pressure variance is to achieve, as far as possible, a direct connection between sensor element and medium. The rear of the silicon sensor is soldered to a supporting element designed for excellent fluid dynamics, which, in turn, is secured flush at the front of the pressure connection. This sophisticated design enables dynamic measurements with a bandwidth of 0-50 kHz as well as excellent decoupling of mounting forces and structure-borne vibration, extensive media compatibility, and the durability offered by the anti-oxidation coatings.

Other impressive features of the M5 series are its overpressure protection of up to five times the measurement range and its pressure connection with an external thread of just Ø 5 mm for installations in space-limited locations.

The pressure sensors in the M5 series are intended for operating temperatures between -40 °C and +180 °C with a narrow total error band (i.e. including temperature errors) of ±1 per cent.



*The new M5 series pressure sensor*

Without the remote signal converter, they come with a typical output signal range of 80 mV (based on a 1 mA supply) and an individual calibration certificate. The 3 bar, 10 bar and 30 bar measurement ranges are available for absolute pressure measurements. Separating the pressure sensor and the signal converter enables measurements at close proximity, even in units installed in cramped conditions and

exposed to high temperatures.

The analogue signal path is adjusted in real time via the compensation electronics, which are fully controlled by a microprocessor. This ensures the output signal, amplified to 0...10 V, retains the full dynamic range of the sensor signal. The measurement system, consisting of the pressure sensor and signal converter, undergoes an end-to-end calibration at the factory once the customer-specific parameters have been determined. In addition, the operating temperature range of -40 to +125 °C for the remote electronics satisfies the exceptional demands required by engine test benches, for instance.

The thermally ultra-robust pressure transducers in the M5 series support high-precision static and dynamic measurements up to a bandwidth of 50 kHz and at working temperatures of up

to 200 °C at the pressure sensor. With its M5 connection thread, the remote pressure sensor – which contains no oil and associated isolation diaphragm and no sealant or adhesive in contact with the media – is ideal for taking highly dynamic measurements at close proximity. It can do this even with the very thin pipes used in engine test benches, in wind tunnels or during turbine blade tests.

## Added-value piping solutions from Raccortubi Middle East

RACCORTUBI MIDDLE EAST continues to stock and supply piping materials destined for critical applications such as chemical and petrochemical plants, oil installations, power plants, shipyards, fertiliser plants and offshore platforms. It is offering pipes, fittings and flanges in stainless steel, duplex, superduplex, superaustenitics and nickel alloys from its warehouse in Dubai.

As part of Raccortubi Group's global distribution network, Raccortubi Middle East is providing customers in the region with solutions for maintenance and urgent requirements, as well as complete project packages.

It is thanks to Raccortubi Group's unique organisational structure, effectively combining both stockholding and manufacturing activities, that Raccortubi Middle East is able to give customers reduced lead times and increased cost efficiency. The integrated production of butt weld fittings guarantees not only constant stock replenishment, but also the quality of the final product. Available off-the-shelf at Raccortubi Middle East, items already come hand-in-hand with the relevant quality certifications/approvals.



*The Raccortubi Middle East warehouse in Dubai*

Sunzeev Swami, managing director of Raccortubi Middle East, explains the concept, "It means that the customer can take one less step. We do the legwork in terms of manufacturing, sourcing the best materials at the best price, and bringing everything together, including any special or additional requirements that the customer may have. We are a one-stop shop."

In addition, with Raccortubi's 2014 acquisition of Petrol Raccord, manufacturer of standard/customised butt weld fittings in stainless steel, duplex, superduplex, superaustenitics and nickel alloys up to 56", and without wall thickness limitations, the Group has completed its production range and can offer customers a fully comprehensive service.

## Advanced solution for Sulphur Recovery Process (SRU)

LUMASENSE TECHNOLOGIES, PROVIDERS of innovative temperature and gas sensing devices, will be showcasing its E2T Pulsar family of detection systems at SOGAT 2016 to be held in Abu Dhabi from 20-24 March.

The LumaSense E2T Pulsar family of detection systems are designed for continuous and instantaneous measurement of refractory temperature, gas temperature or integrated temperature in a given vessel, away from heat, vibration and corrosive gases.

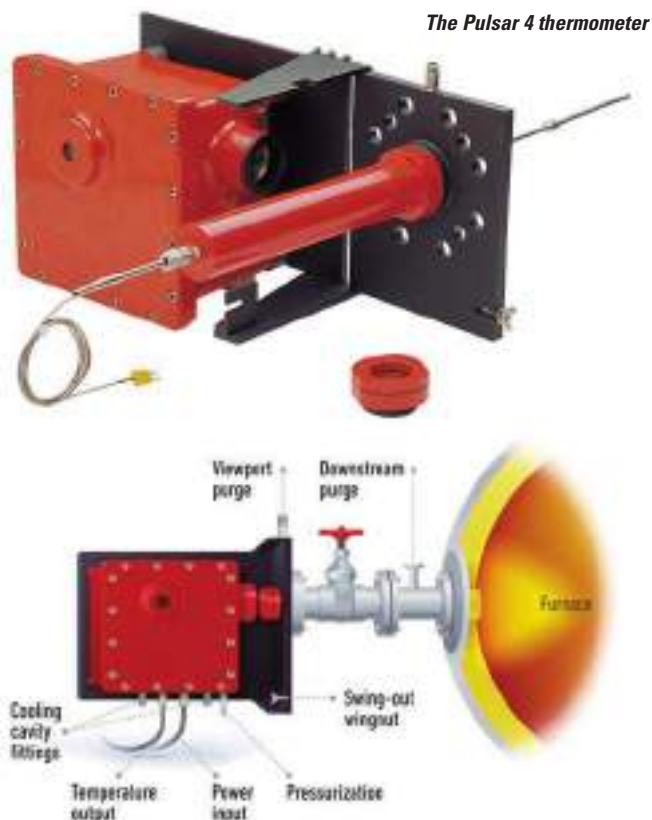
Lumasense Technologies' Pulsar 4 offers both simultaneous gas and refractory temperature measurement, using a single thermometer installation and separate 4-20mA or digital outputs.

The use of these two wavelengths makes it possible to apply a compensation calculation – the Flame Measurement Algorithm (FMA) – to remove the variable effects of flame transparency on the separate measurements.

This FMA programme takes measurements from both the gas and refractory readings and compensates for changing flame transparency in real-time, removing the inherent measurement errors of typical infrared thermometers.

In addition, the Pulsar 4 requires little to no maintenance and eliminates the need to perform field calibrations when operating in FMA mode. Each system allows visual inspection of combustion processes, refractory cureout and preventative maintenance while the vessel is pressurised and fully operational.

For further information contact Gerard Ames, LumaSense Technologies BV, tel : + 31 651 648 299, email : [info@lumasenseinc.com](mailto:info@lumasenseinc.com), [www.lumasenseinc.com](http://www.lumasenseinc.com).



## 3M strengthens its commitment to the Middle East

INNOVATIVE SCIENCE-BASED COMPANY 3M has recently opened customer experience centres (CECs) in Abu Dhabi and Dammam, Saudi Arabia, dedicated to the oil and gas sector.

The facilities will share knowledge and best practice with key stakeholders of Saudi Arabia's and Abu Dhabi's oil and gas sectors, addressing their needs and solving complex issues at a time when oil and gas companies are looking at innovative solutions to improve productivity and lower operational costs.

3M offers more than 10,000 products that are used at all points across the oil and gas industry, ranging from advanced materials to personal safety equipment. 3M solutions improve productivity for the oil and gas industry, protect and extend the life of critical assets, and protect people and the environment in which they operate. With its culture of creative collaboration, 3M's strength lies in continually reinventing and adapting products and technologies in response to customer demand.

Speaking at ADIPEC, where the company exhibited for the first time in 2015, Debarati Sen, formerly global business director, oil and gas solutions at 3M commented, "Oil and gas is critical for 3M in this part of the world, and we want to make sure we're in step with the region's investment plans. Saudi Arabia and the UAE in particular are



**Debarati Sen, formerly global business director, oil and gas solutions, 3M**

key markets for us, and are the two countries we see as most efficient in generating oil and gas. We've been hearing about the long-term investments in the region; here it is a question of becoming more efficient through the downturn rather than of survival. The need to improve technologies has become more urgent. Operational efficiency is very much a theme right now, creating an opportunity for providing the technologies that can drive cost efficiency."

Explaining the role of 3M's customer experience centres, Sen said, "We want our customers to touch and feel our technology; at our customer experience centres 3M technology comes to life. Over the past three years we have established CECs in six out of 19 globally recognised oil and gas cities, so we're expanding fast in this area – we believe we cannot succeed without bringing our technologies close to our customers.

"We have typically seen two types of customer interaction at our centres; one is benchmarking, where visitors can see how we

leverage our technology platforms globally across so many different product divisions and areas of expertise; several companies in this part of the world are currently benchmarking us. The other is when customers come in with their problems, touch and feel our technologies and come up with new ideas and solutions – so it's not a one-way process, it's a two-way technical exploration."

Aside from operational efficiency, what does she see as growth areas?

"Unconventional developments have strong potential in this part of the world; operators have had the luxury of easy oil and they're realising that if they move to unconventional they can get access to a lot more, with lower extraction costs," Sen remarked. "There is also a strong focus on getting more out of existing assets. Some markets, such as Oman and Qatar, are maturing and looking at EOR. Now we're in the golden age of oil and gas – in the past it was expensive and high risk. The technology has improved so that extraction has become safer and more efficient in many ways.

"Regulation is another rapidly developing element; this region is making step changes in regulations and standards.

"We feel we're just scratching the surface now; it's an exciting time for us in this part of the world," Sen concluded.



**The opening of the customer experience centre in Dammam**



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## Cleaning specialist Karcher wins Superbrand 2016 in the UAE

INNOVATIVE CLEANING TECHNOLOGY solutions provider Karcher recently won the 'Superbrand for 2016' award in the UAE.

Richard Nouria, managing director of Karcher Middle East, said, "We are thrilled to have been voted as a UAE Superbrand for 2016. It is gratifying to know that our efforts in continuous improvement in our sales and after sales services, customer and partner relationships are recognised through our brand. The Superbrand status is an endorsement of the quality and innovation we strive for in our products as well as our people, and proof of our commitment to all our customers in the UAE."

Speaking about Karcher products in the region, Riad Zreik, regional sales manager (industrial and vehicle wash), noted that cleaning offshore platforms and removing paint from hulls in shipyards are some of the application areas of its ultra-high pressure water jet systems (UHP) and are as diverse as those of pumps, systems and water tools currently available on the market, which have operating pressures between 250 and 4000 bar.

"The oil sector is the main industry in this region of the world, and Karcher has developed several UHP products for the upper, middle and downstream segments, including explosion-proof high pressure cleaners, ultra-high pressure pumps and robot accessories for cleaning the ship hull of giant oil tankers."

UHP is Karcher's specialty product and plays a necessary role in the maintenance of oil refineries and the petrochemical industry. It is used to clean all types of heat exchangers – dirty or blocked heat exchangers involve high energy losses and costs. Maintaining perfect function ensures efficiency and a constant process temperature.

Another application of UHP is pipe cleaning. Over the course of time, sulphite, salt or limestone deposits build up layer by layer and total blockage



**Karcher sold 12.72mn machines in 2014 (Photo: Karcher)**

can occur if action is not taken in time. Therefore, regular interior cleaning is absolutely essential and exterior cleaning is also obligatory, the award-winning company said.

Other applications include cleaning of condensers and air coolers, refurbishing oil tanks when there is a paint stripping task or when there is need for washing away sludge.

Despite the drop in oil prices, Zreik reiterates that fact that the market is going in a good direction for Karcher and it is striving to maintain the highest standards across the value stream, with cleaning an important part of the stream as it can influence operating cost and yield.

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# RIG COUNT ←



## 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 MONTH			VARIANCE	LAST MONTH			LAST YEAR		
Country	Land	OffShore	Total	From Last Month	Land	OffShore	Total	Land	OffShore	Total
Middle East										
ABU DHABI	30	18	48	-1	31	18	49	25	11	36
DUBAI	0	2	2	0	0	2	2	0	2	2
IRAQ	49	0	49	-2	51	0	51	61	0	61
JORDAN	0	0	0	0	0	0	0	0	0	0
KUWAIT	40	0	40	-3	43	0	43	45	0	45
OMAN	70	0	70	-3	73	0	73	57	0	57
PAKISTAN	23	0	23	0	23	0	23	19	0	19
QATAR	3	6	9	2	2	5	7	2	7	9
SAUDI ARABIA	106	18	124	-5	110	19	129	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	-1	1	0	1	3	0	3
TOTAL	321	44	365	5	334	44	377	309	38	347

### North Africa

ALGERIA	51	0	51	2	49	0	49	49	0	49
EGYPT	31	11	42	-2	33	11	44	46	16	52
LIBYA	0	1	1	0	0	1	1	4	3	7
TUNISIA	1	0	1	0	0	0	0	0	3	3
TOTAL	83	12	95	1	82	12	94	102	9	111

Source: Baker Hughes

# Project Databank

Compiled by Data Media Systems

## OIL, GAS AND PETROCHEMICAL PROJECTS - BAHRAIN

Project	City	Facility	Budget (\$ US)	Status
Bahrain LNG WLL - Liquefied Natural Gas Receiving and Regasification Terminal	Hidd	Liquefied Natural Gas (LNG)	660,000,000	Engineering & Procurement
Banagas - Central Gas Plant 3	Sitra	Gas Treatment Plant	600,000,000	Engineering & Procurement
Banagas - Fuel Pipelines and Storage Facilities Expansion	Sitra	Gas Storage Tanks	80,000,000	EPC ITB
Bapco - A-B Pipeline	Abqaiq - Sitra	Oil	350,000,000	EPC ITB
BAPCO - Bapco Modernisation Program (BMP) - Residue Conversion Unit	Sitra	Refinery	800,000,000	FEED
NOGA - Gazprom - Liquefied Natural Gas (LNG) distribution centre	Various	Liquefied Natural Gas (LNG)	600,000,000	Feasibility Study
NOGA - Onshore Deep Gas Exploration	Various	Gas Exploration	200,000,000	Engineering & Procurement
Tatweer Petroleum - Central Gas Dehydration Facilities	Awali	Gas Processing	100,000,000	Engineering & Procurement

## Project Focus

Compiled by Data Media Systems

### Project Summary

<b>Project Name</b>	BANAGAS - CENTRAL GAS PLANT 3
<b>Name of Client</b>	Banagas - Bahrain National Gas Company
<b>Budget (\$ US)</b>	600,000,000
<b>Facility Type</b>	Gas Treatment Plant, Sitra
<b>Status</b>	Engineering & Procurement
<b>Project Start</b>	Q1-2014

<b>End Date</b>	Q2-2018
<b>FEED</b>	JGC Corp.
<b>Main Contractor</b>	JGC Corp.
<b>Contract Value (\$ US)</b>	355,000,000
<b>Award Date</b>	Q1-2016

### Project Status

Bahrain National Gas Company (Banagas) plans for the expansion of its Sitra gas processing facilities with the addition of a third train. The expansion project aims to utilise the excess associated gas resulting from increased crude production by Tatweer Petroleum. The expansion will increase Banagas processing capability by 350mn cubic feet of associated gas. The scope of work includes the construction of Central Gas Plant and associated facilities.

Date	Status
27 Jan 2016	Japan's JGC Corp has signed engineering, procurement and construction (EPC) deal of US\$355mn with Bahrain's Banagas to build the Central Gas Plant 3.
03 Dec 2015	CB&I, Technip, and JGC Corporation submit bids for the EPC contract.
02 Jul 2015	Banagas receives the FEED studies from the following companies: <ul style="list-style-type: none"><li>• CB&amp;I (Netherlands)</li><li>• Technip (Italy)</li><li>• JGC Corporation</li></ul> Technip has joined the bidding competition after AMEC has dropped its plans to bid.
16 Feb 2015	3 contractors have been pre-qualified for the FEED contract (AMEC, CB&I Inc, JGC Corporation). Contractors have until Q4-2015 to submit their FEED studies.
26 Oct 2014	Banagas invited contractors to prequalify for competitive FEED contract. The prequalified contractors will conduct the gas plant FEED in parallel under a design competition. The winner of this competitive FEED will be given the EPC and the PMC contracts.

# Project Databank

Compiled by Data Media Systems

## Project Focus

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### Project Summary

<b>Project Name</b>	TATWEER PETROLEUM - CENTRAL GAS DEHYDRATION FACILITIES, AWALI
<b>Name of Client</b>	Tatweer Petroleum
<b>Estimated Budget (\$ US)</b>	100,000,000
<b>Facility Type</b>	Gas Processing
<b>Status</b>	Engineering & Procurement
<b>Project Start</b>	Q3-2013
<b>End Date</b>	Q3-2018
<b>FEED</b>	Wood Group PSN
<b>Main Contractor</b>	Petrofac
<b>Award Date</b>	Q3-2015

### Background

The project is a significant part of Tatweer Petroleum's commitment to secure the delivery of natural gas needed to meet the growing demands of the Kingdom of Bahrain. The installation of a new Gas Dehydration Facility is the first of a series of planned gas capacity projects scheduled for the next three to five years.

### Project Status

Date	Status
09 Feb 2016	Work is proceeding as scheduled.
21 Sep 2015	Petrofac Offshore Projects & Operations business has been awarded the EPC contract.
Jan 2014	USA's OXY releases the EPC tender.

### Project Schedules

EPC ITB	1Q-2014
Engineering & Procurement	3Q-2015
Construction	4Q-2015
Completed	3Q-2018

### Contractors

Contract Type	Pre-Qualified	Bidders	Awarded
EPC	<ul style="list-style-type: none"><li>Larsen &amp; Toubro</li><li>Technip</li><li>Ramsis Engineering</li><li>Petrofac</li><li>JGC Gulf International Company</li><li>Mechanical Contracting &amp; Services Company (MCSC)</li></ul>	<ul style="list-style-type: none"><li>Larsen &amp; Toubro</li><li>Technip</li><li>Ramsis Engineering</li><li>Petrofac</li><li>JGC Gulf International Company</li><li>Mechanical Contracting &amp; Services Company (MCSC)</li></ul>	<ul style="list-style-type: none"><li>Petrofac</li></ul>
FEED	-	<ul style="list-style-type: none"><li>Wood Group PSN</li></ul>	<ul style="list-style-type: none"><li>Wood Group PSN</li></ul>
Sub-Contractors	-	<ul style="list-style-type: none"><li>Comsip Al Aali</li></ul>	-

### Project Scope

The scope of work includes:

- 500 MMSCFD gas dehydration unit
- Non-associated gas dehydration unit
- Pipelines

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across **13** major sectors



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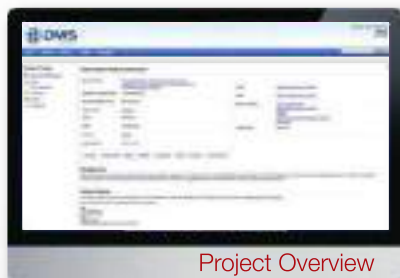
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## KEY FEATURES

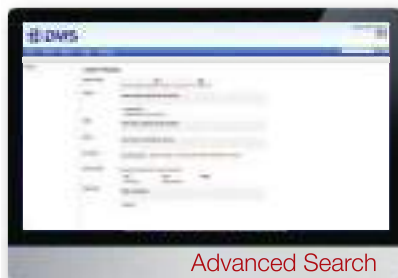
- Project Scope and Background
- Track Project Schedules
- Key Personnel Details
- Track Entire Project Lifecycle
- Access Linked Projects
- Access Project Locations
- Advanced Search Features
- Favourites, Notes, Reminders
- Track Updates
- Customized Email Alerts
- Statistics, Analysis & Forecasting
- Data Download
- Project Values and Financing
- Global Network of Researchers
- Customized Research Modules
- Business Profile of Colleagues

## NEW FEATURES

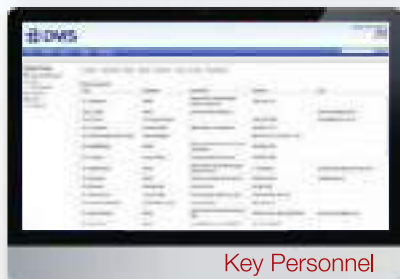
- Customizable Dashboard
- Messaging/Sharing Projects Amongst Your Members Group
- Stream Current Industry News Through Your Dashboard
- Forecast Models by Feasibility & EPC Award Dates
- Compare Contractor Workloads Against Each Other
- 65 Levels of Key Personnel
- Deeper Project Financing Data



Project Overview



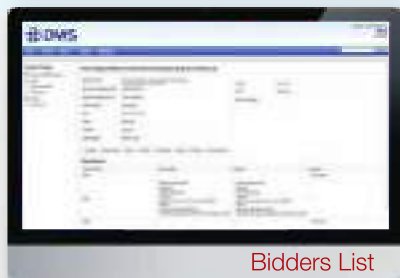
Advanced Search



Key Personnel



Market Forecast



Bidders List



Industry News

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منها. ركّز. قدر الإمكان. مبيعات أصولك على الأصول غير المركزية بالنسبة للاستراتيجية طويلة الأمد. فالمنظمات ذات التركيز الأقوى على أساسياتها تعتبر دوماً مجهزة بشكل أفضل خلال أوقات الضغط أو التقلب الشديد. وإذا لم يكن من الممكن التخلص من الزيادات، فقم بإدارتها بعناية، آخذاً في الحسبان تأثير فجوة المهارات، وتأكد من الجاهزية والتأهب للنمو المستقبلي عندما تنتعش أسعار النفط من جديد.

تفاوض مجدداً مع الماويل حول التخفيضات، وذلك من أجل إدارة تكاليف الخدمة والإنفاق الجاري. قد يوجد مجالاً هنا لذلك حيث إن مرّدين عديدين قد يفضلون الحصول على هوامش ربح أقل بدلاً من تعطل المعدات في هذه المرحلة الصعبة التي نشهدها حالياً.

### إدارة التمويل

على المدى القريب، قد يتمحور، في الغالب، كل شيء حول البقاء، ولكن ينبغي ألا تغفل عينك عن سيناريو معقول للنمو على المدى الطويل. ولكي تمنح منظمتك الفرصة الأفضل لاستقطاب التمويل، احرص على أمن تدفق الدخل الحالي، حتى ولو كان منخفضاً. فهذا الاستقرار يعد عاملاً أساسياً لضمان وجود تدفق ثابت للدخل. ومن المهم صياغة تأثير معدلات الفائدة المرتفعة على البنك المصدر وتمويل الدين. حاول الحصول على صورة واقعية. فمن غير الممكن تخطيط أسعار النفط على مسار آمن ومتصاعد لدفع معدلات الفائدة الأعلى من خلال الدخل المستقبلي كما كان الأمر عليه في الماضي. وبما أن التقليل من المخاطر والتعرض لها يصبح - في هذه الحالة - أمراً حاسماً، ابحث عن خيارات أخرى للتمويل غير الاستدانة. على سبيل المثال، مع المستثمرين المتخصصين في حصص الملكية والذين يعملون - حصرياً - في قطاع النفط والغاز. باختصار، ستكون صناديق الملكية الخاصة في صفك.

### إدارة عوامل التأثير الخارجية

ينبغي أن تتطلع منظمتك إلى أن يكون لها صوت واضح ومحترم حول قضايا القطاع الأساسية؛ مثل الدور الداعم الذي تلعبه الحكومة من خلال القوانين وأطر الشفافية العالمية، أو الحوافز الضريبية لدعم الإيرادات المخفضة. وعلى صعيد مماثل، لا يجب أن يكون التصدي للأزمات، التي لا يمكن تفاديها على المدى القصير، على حساب النظرة والتطلع طويل الأمد للمستقبل. كما يجب عليك أن تفكر في التقييم المتواصل للقضايا الاستراتيجية؛ مثل سياسة التغير المناخي (COP 21) وتأثيراتها على المدى القريب والبعيد.



على قادة قطاع النفط ومديري الحسابات أن يضعوا العوامل الرئيسية تحت السيطرة حتى يحققوا النجاح في الظروف الحالية

## الصمود أمام العاصفة

يلخص تقرير جديد، صادر عن جمعية المحاسبين القانونيين المعتمدين البريطانية (CC)، العوامل الأساسية التي ينبغي أن يتقنها قادة الأعمال في قطاع النفط والغاز إذا كان لهم أن ينجحوا في هذه السوق الأكثر تقلباً وتنافسية، والتي يشهدها هذا القطاع في الوقت الحالي.

العوامل الخارجية. ضع هذه العوامل الأربعة تحت السيطرة وامنح منظمتك الفرصة الأفضل للنجاح.

### إدارة النمو

حدّد المشاريع التي تنطوي على درجة مرتفعة من الشكوك وقم بتأجيلها. كن قاسياً!!! لا سيما مع تلك المشاريع التي ما زالت في بدايتها، والتي يمكن إلغاؤها دون إحداث الكثير من الصخب. ابحث عن شركاء لمشاركة مخاطر المشاريع، ومنافعها بالطبع. على سبيل المثال من خلال بيع جزئي لحصة تشغيلية في الاكتشافات الجديدة. وإن كان في وسعك، استكشف فرصاً للنمو من خلال الاستحواذ في مجالات تفتح المجال للدمج، كما هو الحال مثلاً بالنسبة لخدمات حقول النفط. فليس هناك سبب يدفع المنظومة الحالية نحو عقلية تشلّ النمو وتوقفه تماماً. قد تكون هنالك فرص قيمة للنمو في الوقت الحالي؛ مثلاً من خلال الدمج والاستحواذ، أو من خلال مواصلة الاستثمار في مشاريع مهمة وطنياً وعالية المستوى مع قيمة أطول أمداً.

### إدارة التكلفة

لا تفرط في جميع أصولك دون التمييز بين الغث والسمين

مع انخفاض أسعار النفط إلى ما دون ٣٠ دولاراً أمريكياً، ومع عدم استبعاد إمكانية حدوث مزيد من الانخفاض في الأسعار، تصرّح فاي شوا، رئيسة قسم العقود الآجلة بجمعية المحاسبين القانونيين المعتمدين، ومعدّة التقرير الذي يحمل عنوان انخفاض الأسعار وارتفاع التوقعات: «التدفقات النقدية المطلوبة للنفط والغاز»، قائلة: «خطر انخفاض الأسعار في الوقت الحالي ما زال يشكل تهديداً حقيقياً لعدد من شركات النفط والغاز. وقد تجمعت ثلاثة عوامل رئيسية لتشكّل عاصفة عنيفة في هذا القطاع. أولها: انخفاض التدفقات النقدية نتيجة لانخفاض أسعار النفط. ثانيها: الآثار البغيضة للدين القائم المعلق. ثالثها: ما يسمى بـ «التغير الكبير في الطاقم». إذ أن التقاعد الوشيك لكبار المتخصصين الخبراء على مدار السنوات الخمس المقبلة، سيخلق فراغاً هائلاً في المواهب غداة حصوله». أما قادة الأعمال القادرون على توجيه دفة منظماتهم بنجاح خلال هذه الفترة الحافلة بالتحديات، فيسكونون في موقع يؤهلهم للازدهار. فما الذي ينبغي - إذن - على هذا القائد الناجح أن يأخذه بعين الاعتبار وهو يتعامل مع هذه التحديات؟ تقول شوا: «العامل الأساسي المساعد على تخطي الأمواج المتلاطمة، التي نشهدها حالياً في قطاع النفط والغاز، يكمن في الإدارة الجيدة للنمو، والتكاليف، والتمويل، وتأثيرات



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## إكسون موبيل تتوقع نمواً طويلاً المدك في الطلب على الطاقة



سيظل النفط المصدر الأساسي للوقود في عام ٢٠٤٠

توقع عدد ٢٠١٦ من تقرير «التوقع المستقبلي للطاقة»، الصادر عن شركة إكسون موبيل، والذي يعطي توقعاً لاتجاهات الطاقة على المدى الطويل، أن يزداد الطلب العالمي على الطاقة بنسبة ٢٥ في المائة في الفترة بين ٢٠١٤ و ٢٠٤٠، مدفوعاً بنمو السكان، وتوسع النشاط الاقتصادي.

يذكر التقرير أنه خلال هذه الفترة، سيزداد عدد سكان العالم حوالي ملياري نسمة، وستواصل الاقتصادات الناشئة في التوسع بشكل كبير. كذلك سيحدث معظم النمو في الطلب على الطاقة في الدول النامية التي ليست جزءاً من منظمة التعاون الاقتصادي والتنمية (OECD)، مع توقع أن تستحوذ كل من الهند والصين معاً على نصف النمو تقريباً في الطلب العالمي على الطاقة. كما أنه من المتوقع حدوث زيادات هائلة في الطلب على الطاقة في كل من البرازيل والمكسيك وجنوب أفريقيا ونيجيريا ومصر وتركيا والمملكة العربية السعودية وإيران وتايلاند وإندونيسيا. ويشهد الطلب العالمي على الكهرباء ارتفاعاً بنسبة ٦٥ في المائة في الفترة بين ٢٠١٤ و ٢٠٤٠ بمقدار مرتين ونصف أسرع من الطلب الكلي على الطاقة، مع توقع أن تتجاوز منطقة الشرق الأوسط أمريكا الشمالية باعتبارها أكبر مستهلكي الكهرباء في المنازل.

ومن المنتظر أن يشكل النفط والغاز الطبيعي نسبة ٦٠ في المائة تقريباً من الإمدادات العالمية، مع توقع أن يحقق مكاسب هائلة كل من الغاز الطبيعي المسال، وبنفط الصخر الزيتي، وبنفط المياه العميقة، والغاز غير التقليدي، وبنفط الرمال الزيتية. هذا وسيظل النفط المصدر الرائد للوقود، وعليه، ستظل كل من منطقة الشرق الأوسط وروسيا أكبر مصدري النفط حتى عام ٢٠٤٠، فيما ستتحفز أمريكا الشمالية، التي كانت لعقود كثيرة أكبر مستورد للنفط، مسارها لأن تصبح مُصدراً خالصاً في حوالي عام ٢٠٢٠.

أما الغاز الطبيعي، فمن المنتظر له -وفقاً للتقرير- أن ينتقل إلى المكانة الثانية، ومن المتوقع له أن يلبي حوالي ٤٠ في المائة من النمو في

وفي الوقت نفسه، من المنتظر أن تساعد المكاسب المحققة من كفاءة استخدام الطاقة، وزيادة استخدام مصادر الطاقة المتجددة، وخفض وقود الكربون (مثل الغاز الطبيعي) في خفض كثافة الكربون في الاقتصاد العالمي بمقدار النصف. وتتوقع هذه النظرة المستقبلية أن تبلغ انبعاثات ثاني أكسيد الكربون، المتعلقة بالطاقة العالمية، ذروتها في عام ٢٠٣٠ تقريباً، ثم تبدأ -بعد ذلك- في الانحدار. فالانبعاثات في دول منظمة التعاون الاقتصادي والتنمية، من المنتظر لها أن تنخفض بحوالي نسبة ٢٠ في المائة في الفترة من ٢٠١٤ إلى ٢٠٤٠.

وأضاف وليام كولتون، نائب رئيس التخطيط الاستراتيجي بشركة إكسون موبيل قائلاً: «إن الاتفاق الذي تم التوصل إليه في مؤتمر المناخ (COP 21) الذي عُقد مؤخراً في باريس، حدد الكثير من الأهداف الجديدة. وبالرغم من أن العديد من السياسات ذات الصلة ما زالت ناشئة، فإن النظرة المستقبلية ما زالت تتوقع بأن تزيد مثل هذه السياسات من تكلفة انبعاثات ثاني أكسيد الكربون على المدى الطويل».

الاحتياجات العالمية من الطاقة، مع توسيع روسيا/بحر قزوين لقيادته باعتباره أكبر مصدر للغاز الطبيعي. ويتوقع التقرير أن يشكل الغاز الطبيعي غير التقليدي، مع حلول ٢٠٤٠، حوالي ثلث الإنتاج العالمي من الغاز.

ويذكر التقرير أيضاً أنه من المتوقع أن تمثل مصادر الطاقة النووية والمتجددة -بما في ذلك الطاقة الحيوية، والطاقة المائية، وطاقة باطن الأرض الحرارية، وطاقة الرياح، والطاقة الشمسية- نسبة ٢٥ في المائة تقريباً من الإمدادات بحلول عام ٢٠٤٠، والتي تمثل منها الطاقة النووية وحدها ثلث هذه النسبة تقريباً. ومن المحتمل أن تمثل مصادر الطاقة هذه نسبة ٤٠ في المائة أخرى من النمو في الطلب العالمي على الطاقة بحلول ذلك الوقت.

وقد صرح ريكس دابليو تيلرسون، الرئيس التنفيذي لمؤسسة إكسون موبيل، قائلاً: «يؤكد تحليل مؤسسة إكسون موبيل، وكذلك التحليلات الصادرة عن مؤسسات أخرى مستقلة، النظرة للوضع على المدى الطويل، والمتمثلة في أنه سيتحتم أن تلبي جميع مصادر الطاقة الصالحة للاستخدام الطلب المتزايد».



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البالغة ٧ مليارات دولار أمريكي في حقل 'زهر' على مدار ثلاث سنوات. وسيتم تقسيم العائدات المتبقية بين مصر، التي ستحصل على ٦٥ في المائة، وشركة إيني الإيطالية، التي ستحصل على ٣٥ في المائة. وستقوم شركة بتروبل بإجراء عمليات البحث والتطوير في حقل شروق في مناطق المياه العميقة المتفق عليها.

العامية المصرية للبترول بأن يتوجه جميع إنتاج الغاز إلى السوق المحلي المصري، مع السماح فقط بتصدير الفائض من الغاز. كما يقضي اتفاق امتياز الشروق، الموقع بين شركة إيني الإيطالية والحكومة المصرية، بأن تخصص نسبة ٤٠ في المائة من العائدات تجاه استعادة الاستثمار في الحقول. وستغطي قيمة التعويض لشركة إيني استثماراتها

مكعب يوميا من الغاز الطبيعي. ومن المتوقع أن يبلغ إنتاج حقل الغاز ٧,٧ مليون متر مكعب يوميا من الغاز مع حلول عام ٢٠١٩. وكانت شركة إيني الإيطالية قد اكتشفت حقل غاز «زهر» وهو أكبر حقل في البحر المتوسط يقع في امتياز الشروق - في شهر أغسطس/آب ٢٠١٥. ويقضي الاتفاق بين شركة إيني الإيطالية والهيئة

## أرامكو السعودية تتطلع إلى شراء شركة تكرير هندية

استكملت شركة أرامكو السعودية المباحثات التمهيدية مع مجموعة إيسار الهندية حول قيام أرامكو بشراء شركة تكرير نظير ٥,٥ مليار دولار أمريكي من المجموعة. ووفقا لما ذكرته وكالة بلومبيرج للمعلومات، تفكر مجموعة إيسار في بيع أصولها بعد أن تقلصت أرباحها بحدوث هبوط في أسعار السلع، وضعف الطلب، وانخفاض قدرة التوظيف في شركات الأعمال التابعة لها. وقد وردت تقارير أيضا بأن مجموعة إيسار تتطلع إلى الحصول على ٣ مليارات دولار من بيع حصة تبلغ ٤٩ في المائة في شركة إيسار للنفط إلى شركة روزنفت، وهي شركة نفط روسية معظمها مملوك للحكومة.

وكانت أرامكو السعودية قد ذكرت في السابق أنها ستواصل الاستثمار في قطاع النفط والغاز بالرغم من التباطؤ في قيمة النفط الخام. كما أكدت شركة النفط أيضا أنها تدرس عدة خيارات للسماح بإصدار طرح عام أولي (IPO) لحصتها بالكامل أو جزء منها.

وقد صرح خالد الفالح، رئيس مجلس إدارة شركة أرامكو السعودية، بأن بيع حصة في الشركة سيتضمن إصدارات متعلقة بالقانون والسيادة يلزم تسويتها. وقال: «إن استثمارا في قدرة النفط والغاز لم تتباطأ. فقد تمكنا - ببساطة - من تقليص الإنفاق من خلال خفض التكاليف».

## تخريج الدفعة الأولى من العمانيين لبرنامج اللحام العالمي المتقدم

قامت مؤخرا كل من شركة اتحاد المقاولين العالمية ومؤسسات التركي، العاملين في قطاع النفط والغاز، باستخدام ١٩٥ عامل لحام عماني جديد مؤهلين وفق أعلى المعايير العالمية. فقد أكمل المستخدمون الجدد، الذين تخرجوا في أول فبراير/شباط، فترة تدريب مدتها ٢٠ شهرا في ورشة الحلبان التابعة لشركة ركن اليقين لتنمية المهارات في مسقط بعمان قبل شغل مناصبهم في المشروع الضخم رباب هرويل المتكامل للنفط والغاز التابع لشركة تنمية نفط عمان. ويجمع برنامجها التدريب المهني، الذي تموله شركة تنمية نفط عمان، بين الدراسة النظرية والممارسة العملية. فهو يؤهل المتدربين حتى المستوى G6، وهو المستوى الأكثر تقدما والمُعترف به من هيئات الاعتماد الدولية، مثل معهد اللحام وجمعية اللحام الأمريكية.

وقد تم توجيه الدعوة إلى للخريجين لحضور احتفال في مسقط تحت رعاية الدكتور محمد بن حمد الرومحي، وزير النفط والغاز، في حضور الشيخ عبدالله البكري وزير القوة العاملة. وفي هذا الإطار، قال راؤول ريستوتشي، العضو المنتدب لشركة تنمية نفط عمان: «إننا فخورون بتمكنا من مساعدة هؤلاء الشباب على التقدم في مجالاتهم المهنية، واكتساب المهارات اللازمة للعمل في مجال اللحام. وسيسدأ هؤلاء الخريجون العمل في مشروعنا الضخم في رحاب هرويل، والذي يمثل أهمية استراتيجية للوطن. هذه قصة نجاح أخرى لبرنامج الأهداف الوطني الخاص بنا، والذي يهدف إلى خلق فرص تدريب وتوظيف هادف ومجزية للمواطنين العمانيين. فقد تمكنا إلى الآن من توفير ما يقرب من ٢٠ ألف فرصة عمل منذ عام ٢٠١١، ونحن عازمون على فعل المزيد».



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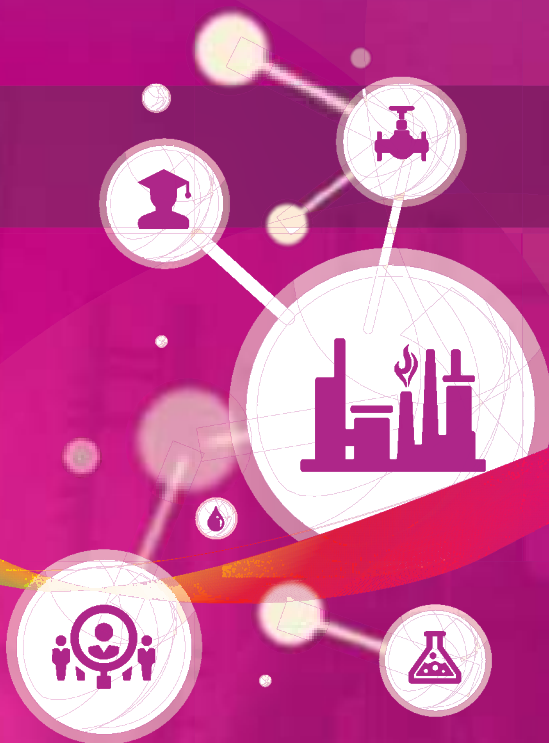
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للبنترول في التنقيب البحري في المغرب وتطلع إلى استخدام قدراتنا المشتركة في هذا المجهود لصالح المغرب».

وفي تطور آخر، أعلنت شركة «ساوند إنرجي» أنها وقعت على اتفاق ملزم مع صندوق الاستثمار في النفط والغاز (ساس) قام بموجبه الصندوق بمنح الشركة عقد خيار بالاستحواذ على حصة ٥٥ في المائة في ترخيص تنقيب حقل ميريدجا البحري. ومنطقة «ميريدجا» متاخمة لترخيص حقل «تندرا» الحالي الخاص بشركة ساوند إنرجي، وهي عبارة عن منطقة واحدة للغاية تبلغ مساحتها ٩٠٠٠ كم<sup>٢</sup> تتقاسم نفس الخصائص الجيولوجية الأساسية مع تندرا حيث، تتوقع الشركة حفر أول بئر لها في غضون فترة قصيرة. ويملك صندوق الاستثمار في النفط والغاز حصة ٧٥ في المائة في رخصة استكشاف في منطقة ميريدجا، في حين يحتفظ المكتب الوطني للهيدروكربونات والمناجم المغربي بالحصة المتبقية البالغة ٢٥ في المائة.

وعلق جيمس بارسونز، الرئيس التنفيذي لشركة ساوند إنرجي، قائلاً: «بعد دخولنا إلى المغرب العام الماضي، انتقلنا بسرعة لبناء موقعنا الإقليمي بشكل أكبر في منطقة واحدة للغاية. إذ يضمن عقد الخيار هذا وصولاً حصرياً لترخيص أساسي متاخم لترخيص حقل تندرا الحالي التابع لشركة ساوند إنرجي. وسوف يمكننا من تحقيق قيمة ملحوظة في حال توجت عمليات التنقيب في حقل «تندرا» بالنجاح، وحقت النتائج المرجوة. كما تبرز الصفقة، بشكل أكبر، شراكتنا القوية مع صندوق الاستثمار في النفط والغاز، وتعزيز بصورة أكبر موقعنا كمشغل بحري رائد في المغرب».



قطر للبنترول ستستحوذ على نسبة ثلاثين في المائة من حصة شيفرون في عقود امتياز للتنقيب البحري في المياه المغربية.

## توقيع صفقات تنقيب جديدة في المغرب

واليدية البحرية العميقة. وقد صرح المهندس سعد شريده الكعبي، العضو المنتدب لقطر للبنترول، بأن الاتفاق يعد «خطوة هامة نحو بناء علاقة مع شيفرون تحقق المنفعة للطرفين، مع التركيز بشكل خاص على أنشطة التنقيب والإنتاج الدولية». وأضاف: «ليس من قبيل المصادفة أن يمتد الوجود الدولي لقطر للبنترول إلى المغرب، وهي البلد الذي يتمتع بعلاقات متميزة مع دولة قطر».

وأضاف علي مشيري، رئيس شركة شيفرون أفريقية وأمريكا اللاتينية للتنقيب والإنتاج أن الاتفاق هو علامة فارقة في جهود الشركتين لتعظيم قيمة أصول التنقيب والإنتاج من خلال علاقات طويلة الأجل. وقال: «نحن سعداء بشراكتنا مع قطر

وقعت كل من قطر للبنترول وشركة شيفرون المغرب للتنقيب المحدودة - إحدى الشركات التابعة لشركة شيفرون العالمية - اتفاقية صفقة تستحوذ بموجبها قطر للبنترول على نسبة ثلاثين في المائة حصة مشاركة في حصة شيفرون البالغة ٧٥ في المائة في ثلاثة عقود امتياز للتنقيب البحري في المياه العميقة.

وبموجب هذه الاتفاقية، التي حظيت بموافقة الحكومة المغربية، ستحتفظ شيفرون أيضاً بحصة نسبتها ٤٥ في المائة، وتظل بذلك المشغل الرئيسي، وستبقى حصة المكتب الوطني للهيدروكربونات والمناجم المغربي عند ٢٥ في المائة. وتتمثل مناطق التنقيب البحرية الثلاث في «كاب غير» البحرية العميقة و«كاب كونتان» البحرية العميقة و«كاب



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هاتف: ٩٢٦٠ ٤٤٨ ٩٢٦١ (٤) ، فاكس: ٩٢٦١ ٤٤٨ ٩٢٦١ (٤) ، بريد إلكتروني: [graham.brown@alaincharles.com](mailto:graham.brown@alaincharles.com)

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المكتب الرئيسي:

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BAUER has been the world's leading manufacturer of high pressure compressors and integrated compression systems for industrial offshore applications as well as breathing air, for over 65 years. We've worked for many years to **evolve** our compressors and nitrogen generation systems to meet the ever rising costs and increased safety requirements for offshore operations. Our systems are designed with offshore applications in mind, safely delivering consistent purity at higher capacities than ever before.

BAUER understands that reliability and optimal performance are extremely critical for drilling operations. **Evolve with us.**

الشرق الأوسط

# النشرة النفطية

تُعنى بالنفط والغاز ومعالجة الهيدروكربون

UK£10, USA \$16.50

العدد الثاني 2016

## الصمود

## أمام

## العاصفة

العوامل التي يجب  
على قادة العاملين  
في قطاع النفط  
والغاز أن يتقنوها لكي  
يحققوا نجاحا  
في الظروف الحالية.  
علاوة على أحدث  
أخبار قطاع النفط  
والغاز عبر منطقة  
الشرق الأوسط.

• توقيع صفقات تنقيب جديدة في المغرب

• إيني والهيئة المصرية العامة للبترول

توقعان اتفاق مشروع مشترك

• أرامكو السعودية تتطلع إلى شراء

شركة تكرير هندية

• تخريج الدفعة الأولى من العمانيين

لبرنامج اللحام العالمي التقدمي

• اكسون موبيل تتوقع نموًا طويل

المدى في الطلب على الطاقة