

Oil Review

Oil · Gas · Petrochemicals

Middle East

VOLUME 20 | ISSUE 6 2017

What lies ahead for the LNG market?

- Transforming Kuwait's energy future
- Mixed picture for oil and gas workforce
- Digital data for the compressed air market
- Functional safety in times of cyber criminality
- Automation and digitalisation for efficient refining operations
- Meeting the region's need for maritime arbitration



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Printed by: Buxton Press

Printed in: September 2017

© Oil Review Middle East ISSN: 1464-9314



→ Editor's note

THE KUWAIT OIL & Gas Show and Conference (KOGS) is set to be the single biggest gathering of the oil and gas industry ever seen in Kuwait, according to the organisers. Perhaps this is an indication of the buoyant state of Kuwait's oil and gas sector, with expenditure over the next five years projected at 34.5bn KD (US\$112bn) and an ambitious plan to expand production capacity to four million bpd by 2020 (see p12). Our preview of KOGS includes an interview with Hosnia Hashem, conference programme chair and deputy CEO Olefins and Aromatics, Petrochemical Industries Company (PIC) (p42), who comments on the focus on integration and diversification, and prospects for Kuwait's energy future. Our cover feature looks at prospects for the LNG market, highlighting the growth in demand in the Middle East (p16), while the technology section includes a look at how the IoT can enable users of compressed air services to optimise and improve their processes (p44).

→ Contents

Contents

- 4 Executives' calendar and event news**
Event news as well as a look at MEPEC 2017 and ADIPEC 2017

Oil & Gas News

- 8 Developments**
A round-up of the latest news from around the region, including Saudi Aramco's exploration activities in the Empty Quarter

Analysis

- 12 Kuwait's energy sector embraces change**
Kuwait Petroleum Corporation and its subsidiaries continue to overhaul the country's long-established and strategically vital energy sector – at home and abroad
- 16 What future for the LNG market?**
LNG demand is accelerating, but so is the expected supply, says Moin Siddiqi, economist

Refining & Petrochemicals

- 20 Promoting safe and efficient operations**
How ABB's solutions are helping operators to reduce costs while maintaining safety and production efficiency

Shipping & Marine

- 26 Serving the region's need for maritime arbitration**
The role and activities of the Emirates Maritime Arbitration Centre (EMAC)

Recruitment & Retention

- 32 Mixed picture for the oil and gas workforce**
The employment situation in the region's oil and gas sector remains positive, despite the challenges

Security

- 36 An effective approach for security**
The security market in Iraq and some advice for selecting a security provider

Event Preview - KOGS 2017

- 40 Shaping the future of energy**
The Kuwait Oil & Gas Show and Conference (KOGS) reflects the ambitions of the country's oil and gas industry
- 42 Transforming Kuwait's energy future**
Hosnia Hashem, conference programme chairperson, discusses the themes of the KOGS conference and prospects for Kuwait's oil and gas industry

Technology

- 44 A new era of digital data for the compressed air market**
How the Internet of Things (IoT) can enable users of compressed air services to optimise and improve their processes

Communications

- 52 A Swiss success**
The latest in digital wireless paging technology is supporting a new production field in the Gulf

Company News

- 58 Going from strength to strength**
The growth of GOFSCO to become one of the largest integrated service providers in Kuwait; the opening of Byrne's new Kuwait operation and a new product from AkzoNobel

Arabic

- 5 News/Analysis**

→ Executives' Calendar 2017-18

OCTOBER

8-9	3rd Health, Safety & Security Forum 2017	DUBAI	www.hse-forum.com
9-11	Middle East Process Safety Conference	MANAMA	www.mepsc.org
9-11	Middle East Process Engineering Conference	MANAMA	www.mepec.org
15-18	Kuwait Oil & Gas Show (KOGS)	KUWAIT	www.kogs2017.com
16-17	Basra Oil, Gas & Infrastructure	BEIRUT	www.cwcbasraoilgas.com
17-19	Oil & Money conference	LONDON	www.oilandmoney.com

NOVEMBER

6-7	Gulf Homeland Security	DUBAI	www.gulfhomelandsecurity.com
13-16	ADIPEC	ABU DHABI	www.adipec.com
27-29	12th Annual GPCA Forum	DUBAI	www.gpca.org.ae

DECEMBER

3-5	Solar-Tec	CAIRO	www.solar-tecegypt.com
5-7	Iraq Oil & Gas Show, Basra	BASRA	www.basraoilgas.com
4-5	Bottom of the Barrel Technology Conference	MANAMA	www.europetro.com
11-13	Kurdistan-Iraq Oil & Gas	LONDON	www.cwcklog.com

JANUARY 2018

15-18	World Future Energy Summit	ABU DHABI	www.worldfutureenergysummit.com
21-23	Intersec	DUBAI	www.intersecexpo.com

FEBRUARY 2018

12-14	Egypt Petroleum Show	CAIRO	www.egyptps.com
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MARCH 2018

19-21	Doha Int'l Sustainable Energy Exhibition & Conference	DOHA	www.dohaenergyexpo.com
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Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.

MEPEC 2017 to focus on global process engineering issues

MEPEC 2017, the leading process engineering exhibition in the Middle East, will be held from 9-11 October 2017 at the Bahrain International Exhibition and Convention Centre under the Patronage of His Royal Highness Prince Khalifa bin Salman Al Khalifa, Prime Minister, Kingdom of Bahrain. It is expected to attract more than 2,500 participants, 200 exhibiting companies and thousands of visitors. The conference and exhibition will be inaugurated by H.E. Shaikh Mohamed bin Khalifa Al Khalifa, Minister of Oil, Kingdom of Bahrain.

In line with global process engineering issues, this year's theme is "Sustainable Growth through Process Innovation & Downstream Integration". Emphasis will be placed on topics focusing on process design and development, process excellence, sustainability and downstream integration for value creation.

Keynotes speakers include Ahmad Al Sa'adi (senior VP, Technical Services, Saudi Aramco); Ziad

Al-Labban (CEO, Sadara Chemical Company); Guy Lewis (VP, Strategic Marketing and Planning, UOP, a Honeywell Company); Suleyman Ozmen (Downstream Licensing, VP president, Shell Global Solutions, US Inc); Fuad Mosa (GM, Local Content Unit, Innovation & and Business Development, SABIC); Ed Boufarah VP, Digital Solutions - MEA & India, Baker Hughes, a GE company); and Dave Andrews (VP, Catalysts & Licensing, ExxonMobil Chemical). Subjects covered range from Transformation from Volume to Value to Digitisation Revolution & the Petrochemical Industry.

MEPEC will see three co-located events taking place alongside; the Leadership Excellence for Women Awards and Symposium; the Middle East Fine and Specialty Chemicals Conference and Exhibition; and the Middle East Process Safety Conference. These four shows offer a world class networking event for visitors, delegates, investors



Stand discussions at MEPEC 2015

and government related organisations. Witness women in engineering get recognised and celebrated for their excellence, as undergraduates race their chemically powered hand-built cars, as starts-ups showcase their innovation to the process engineering community and as young professionals and students solve design challenges and receive mentoring from the best names in engineering.

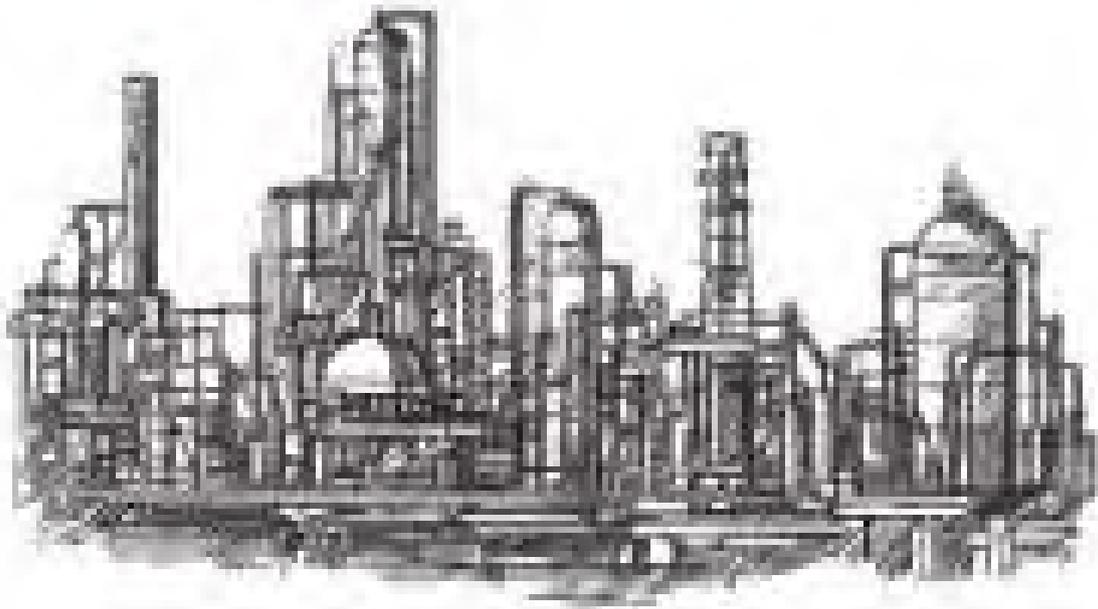
For more information on MEPEC and its co-located shows, visit: <https://www.mepec.org>.



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O&G giants to convene at ADIPEC, programme expanded

HELD UNDER THE patronage of HH Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE, hosted by ADNOC, and organised by the Global Energy division of dmg events, the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) is one of the world's leading oil and gas events, and the largest in Africa and the Middle East. This year's event, to take place from 13-16 November in Abu Dhabi, will feature more than 2,000 exhibiting companies, including 37 leading NOCs and IOCS, and is expected to welcome more than 100,000 visitors.

The 2017 technical conference will see a significant increase in scope to include the downstream industry for the first time. The event will also add more sessions for specialised areas, including offshore and marine exploration and production. With around 900 speakers scheduled for more than 200 sessions, the conference will bring together the industry's most respected experts, global leaders and top decision makers, with around 10,000 delegates attending over the course of four days.

"The key to growth for oil and gas companies will be to find new ideas, and to share information in the pursuit of best practice," said Ali Al Rawahi, reservoir manager at the Abu Dhabi Company for Onshore Petroleum Operations Limited (ADCO) and ADIPEC 2017 technical conference chairman.

"ADIPEC is clearly established as the leading platform for knowledge exchange in oil and gas. The focus will continue to be on improving efficiency and reducing cost, which can only be achieved through sharing experience between companies and across borders."

The expansion to include the downstream sector reflects one of the emerging industry trends in oil and gas, as upstream and midstream companies are increasingly looking towards integration, collaboration and diversification across refining and petrochemicals, processing, and



A full-day Women in Energy programme will focus specifically on the opportunities for and achievements of women in the oil and gas industry

end-product sales to boost overall profitability. Conference sessions include exploration and production geoscience; production facilities technologies; field development; operational excellence; drilling and completion technology; health, safety and environment; projects engineering and management; gas technology; unconventional resources; improved and enhanced oil recovery; people and talent; and petroleum advanced analytics.

The Conference programme will feature two ministerial sessions, four global business leader sessions and four downstream global business leader sessions, eight panel sessions, three offshore plenary panels, nine C-suite dialogue sessions, three industry breakfasts and three topical luncheons. A full-day Women in Energy programme will focus specifically on the opportunities for, and achievements of, women working in the oil and gas industry. The co-located Security in Energy conference returns for a second year, recognising the increasingly critical importance of cyber and infrastructure security within oil and gas operations.

GEO 2018: shaping the energy landscape

THE BAHRAIN INTERNATIONAL Exhibition and Convention Centre is set to play host to a critical exchange of oil and gas insights during the 13th Middle East Geosciences Conference and Exhibition (GEO 2018) from 5 – 8 March 2018.

Held under the patronage of the Prime Minister of Bahrain HRH Prince Khalifa bin Salman Al Khalifa, more than 3,500 geoscientists and petroleum industry professionals from 50+ countries will gather to debate and shape the future of the industry, build skills, network with peers and purchase products and services that will take their E&P programmes to the next level.

The biannual event, established 24 years ago, incorporates a four-day high level conference under the theme 'Pushing the Technical Limits: Shaping the Energy Landscape' organised by the world's three largest professional geoscience associations (AAPG, EAGE and SEG) and a parallel three-day exhibition organised by UBM. GEO 2018 is also supported by an organising committee of NOCs, IOCs and major service providers.

"The conference will host a number of executive sessions led by technical influencers, and we encourage professionals to take this opportunity to participate and share valuable ideas and knowledge. The conference will focus on geological studies, reservoir challenges and the role of geoscience in the environment, safety, risk management and innovation," said Ahmad Al Eidan, GEO 2018 general chair and deputy CEO - Drilling & Technology Directorate, Kuwait Oil Company.

"We are certain that GEO 2018 will be an extraordinary platform which will provide all participants with unlimited benefits and will open new frontiers for the current oil industry challenges," he continued.

A three-day exhibition of oil and gas products and services will run parallel to the conference from 6 - 8 March. Set to feature over 120 exhibitors from 20 countries, the exhibition covers all areas of the oil and gas exploration industry.

Pre-registration for GEO 2018 opens in October at www.geo2018.com. An early bird discount is offered on conference fees up until 5 February 2018.

Iraq Oil & Gas Show

THE SEVENTH EDITION of the leading oil and gas show of Iraq, officially sponsored by Iraq's Ministry of Oil, will be held from 5-7 December 2017 in Basra, Iraq.

The second largest OPEC oil producer, with the world's fifth largest oil reserves, Iraq has immense production potential and is actively seeking investment. The largest fields in the south have relatively low extraction costs owing to uncomplicated geology, multiple supergiant fields, fields located in relatively unpopulated areas, and the proximity of fields to coastal ports.

Iraq Oil & Gas Show will be attended by international visitors from 20 different countries (USA, Singapore, Peru, India, Netherlands, Lebanon, China, UAE, UK, Brazil, Russia, Switzerland, Bangladesh, Nigeria, Cameroon, Canada, Ghana, Azerbaijan, Barbados). A wide variety of opportunities will be available, including networking opportunities and B2B meetings, allowing visitors to make contact with the leading local and international industry members in Iraq.

With 700 sq m of confirmed stand space, exhibitors confirmed to date include Al Imad Group Companies (IRAQ), Al Tabieaa Paints (IRAQ), AWS Co. (IRAQ), Bahra Cables (SAUDI ARABIA), Basra Oil Company (IRAQ), Consolidated Contractors Group (GREECE), DrawWorks (USA), Fircroft (UK), Gulf Commercial Group (UAE), GulfTainer (UAE), Hydromashservice JSC (RUSSIA), Iraq Energy City (UAE), Ministry of Oil, Republic of Iraq, Najma Al Ajyal (UAE), Red Sea Petrochemical Industries (JORDAN), Royal Crown for Training Technology (IRAQ), RSK (UK), South Gas Company (IRAQ), Tech Equipments General Trading (IRAQ) and Jotun (UAE).

Expotim Int'l Fair Organization Inc. is the co-organiser of the event. For further information email info@iraqoilgas.com, or see the website at www.iraqoilgas.com.



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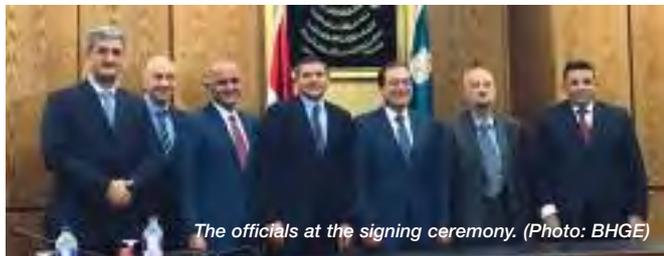
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Baker Hughes wins subsea contract for Zohr field

BAKER HUGHES (BHGE), a GE company, has signed a major subsea contract with Egypt's Petrobel for Phase Two of the 'supergiant' Zohr gas field situated in the Mediterranean Sea, offshore Egypt. The project underscores the company's position as the world's first and only integrated fullstream provider of cutting-edge subsea technology, products, services and digital solutions.



The officials at the signing ceremony. (Photo: BHGE)

BHGE will provide project management, engineering procurement, fabrication, construction, testing and transportation of a subsea production system, including seven manifolds, tie-in systems, long offset subsea and topside control systems, SemStar5 HIPPS (high integrity pressure protection) Systems, workover systems and tools, and will support installation, commissioning and start-up operations.

Tarek El-Molla, Egypt's minister of petroleum and mineral resources, said, "Maximising domestic energy resources and optimising reliability of their supplies are core elements of Egypt's vision. We are able to increase the value and efficiency of the sector by driving a sustainable and energy-efficient economy through the ministry's modernisation programme in partnership with companies such as BHGE. The Zohr gas field is playing a major role in the development of Egypt's domestic energy resources, revenue generation and economic growth."

Lorenzo Simonelli, CEO at BHGE, added, "The Zohr field is one of the most significant developments of its kind, and through this project we can show the efficiency gains that such complex projects can achieve through our enhanced portfolio. This project has the potential to meet Egypt's growing gas demand and save the country billions of dollars that would otherwise be spent on importing gas. Together with our partners, BHGE can support Egypt's needs and vision for the energy sector and demonstrate its leadership in the subsea space."

Petrobel is a joint venture between IEOC (an Eni subsidiary in Egypt) and Egyptian General Petroleum Corporation (EGPC) and is in-charge of the development of Zohr Field on behalf of PetroSherouk, a joint venture between Egyptian Natural Gas Holding Company (EGAS) and IEOC.

PDO contracts boost Omani supply chain

PETROLEUM DEVELOPMENT OMAN (PDO) has signed two deals worth US\$253.1mn for the local manufacturing of vital equipment like transformers and valves for the oil and gas industry.

The deals represent further evidence of PDO's In-Country Value (ICV) programme to retain more of the wealth of the oil and gas sector in the Sultanate and develop domestic supply chains.

PDO managing director Raoul Restucci, said, "We are working hard with our partners to ensure that Oman builds its capacity and capability to competitively and professionally service both the nation's oil and gas industry but also that beyond our borders.

"ICV not only shortens our supply lines and reduces our delivery times and transport costs, but also provides more vocational training and employment opportunities for Omanis. We are delighted to sign these contracts for the provision of important equipment and parts for the oil and gas sector. Beyond the local supply of goods and services to the requisite technical level, they provide the further demonstration of how our contractors and suppliers are playing a greater role in embedding ICV in their operations."



Approximately 41 per cent of PDO's overall contracts are now placed with local businesses (Photo: PDO)

PDO has struck deals with Rusayl-based Voltamp Transformers Oman for the supply of power transformers and Al Jizzi Transformers and Switchgears, located in Ma'abella, for the supply of well head transformers. The companies employ almost 100 Omanis in total.

Approximately 41 per cent of PDO's overall contracts are now placed with local businesses, and as much as 53 per cent of its well engineering contracts are awarded to local community contractors, amongst the highest in the region.

Total divests remainder of its Norwegian field stake to KUFPEC

FRENCH OIL GIANT total said has signed an agreement to sell its remaining 15 per cent stake in Gina Krog oilfield at Norway to Kuwait Foreign Petroleum Exploration Company (KUFPEC) in a deal worth nearly US\$317mn.

This agreement builds on the 2016 transaction between Total and the Kuwaiti firm concerning Norwegian North Sea assets, which included a 15 per cent interest in Gina Krog.

"We have decided to completely divest our interest in the Gina Krog project and focus on other opportunities in Norway, which remains a key country for Total," stated Arnaud Breuilleac, president for exploration and production at Total.

"This sale is in line with our objective to optimise the Group's allocation of capital by efficiently managing our portfolio of assets. With the recent acquisition of Maersk Oil & Gas, announced on 21 August 2017, the group's position in the North Sea will be significantly strengthened," said Breuilleac.

Upon completion of the sale, Total will no longer have an interest in the Gina Krog field, while the Kuwaiti group will have a 30 per cent stake alongside Statoil (58.7 per cent, operator), PGNiG Upstream International (8 per cent) and Aker BP (3.3 per cent). The overall consideration for both deals will total US\$617mn.

The Gina Krog oil and gas field started production in June 2017.

KUFPEC was established by its parent company Kuwait Petroleum Corporation in 1981 to engage in exploration, development and production of crude oil and natural gas outside the country. It is currently active in 14 countries with 54 assets in the international upstream sector.

KUFPEC will add approximately 34mn barrels of oil equivalent in net reserves and approximately 9,000 boepd of production from Gina Krog, which came on-stream in June 2017 and is operated by Statoil. The addition of the new production will take KUFPEC's production in Norway close to 25,000 boepd.

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Saudi Aramco deploys new technology to re-explore Empty Quarter

OIL GIANT SAUDI Aramco is using new technology to re-explore areas of the vast Empty Quarter, which could help to bolster its proven reserves of oil and gas before the company offers its shares to the public, according to sources.

A team of about 900 people is using advanced seismic technology developed over the last few years to explore 15,400 sq km around Turayqa, Saudi Aramco said in a statement.

Turayqa, discovered in 2013, is an onshore conventional gas field that contains no oil. Part of the area was previously explored by joint ventures (JVs) involving Saudi Aramco and foreign companies, Aramco said. The JVs failed to find recoverable quantities of oil and gas.

“Data processing is ongoing. The area partially covers areas relinquished by some of the joint ventures,” the company told *Reuters*.

Saudi Aramco set up four consortia in 2003 and 2004 to explore the Empty Quarter, but they ended their search after failing to find commercial volumes of gas.

The new seismic technology may improve the chances of successful exploration, though it cannot by itself prove the existence of oil and gas reserves; drilling is needed for that.



The Empty Quarter is the largest continuous sand desert in the world, encompassing most of the southern third of the Arabian Peninsula. (Photo: Flickr)

Seismic technology uses artificially induced shockwaves in the earth. While conventional crews have 9,000 frequencies available to monitor the results, the crew at Turayqa has over 50,000.

“The seismic data acquisition technology that is being deployed is truly phenomenal,” said a former executive at the company.

It not only provides a three-dimensional picture of the structure of rock going down several kilometres, but also tells the user about physical characteristics of the rock, such as its density and fluid saturation, he added.

“It is something that far exceeds what was achievable on land 10 years ago.”

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Shell withdraws from Majnoon, to focus on Basra Gas Company in Iraq

OIL MAJOR SHELL has withdrawn from Iraq's Majnoon oilfield, announcing that it will focus its efforts on the development and growth of the Basra Gas Company after handing over operations of the oil venture back to the Iraqi government, according to a Reuters report.

A letter signed by Iraqi oil minister Jabar al-Luaibi, dated 23 August and directed to Shell Iraq Petroleum Development, gave approval for Shell to quit Majnoon, an oilfield near Basra, which started production in 2014.

In November last year, industry sources had told Reuters that Shell was considering selling out of its oilfields in Iraq as part of its global US\$30bn asset disposal programme. The officials said the Oil Ministry and Shell had been discussing investment budgets and production activities but failed to reach a deal.

“We failed to reach an agreement with Shell over its Majnoon operations, including production plans and investments budgets. We think it's for the interest of all parties that Shell should withdraw,” said an oil official who attended a meeting in August in the Oil Ministry to discuss how to manage Majnoon after the withdrawal of Shell.

Shell holds a 45 per cent interest in Majnoon that it operates under a technical service contract that expires in 2030, according to its 2015 annual report. Production from Majnoon, one of Iraq's largest oilfields, is currently at around 235,000 bpd, according to Iraq's oil officials.

Despite the withdrawal from Majnoon, Shell will keep its operations in gas and petrochemical projects in Iraq, the letter added.

“Shell remains firmly committed to Iraq. By handing over the Majnoon operation to the Oil Ministry, Shell will be in a stronger position to maximise value to the government of Iraq and its people as well as our shareholders by focusing its efforts on the development and growth of Basra Gas Company,” a Shell spokesman said.

Basra Gas Company is a joint venture between Shell, South Gas Company and Mitsubishi and the Petrochemical Project NEBRAS.

Shell is also selling its 20 per cent stake in West Qurna 1 oilfield in the south of the country, which is operated by Exxon Mobil.



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Kuwait's energy sector embraces change

Kuwait Petroleum Corporation (KPC) and its subsidiaries continue to overhaul the country's long-established and strategically vital energy sector – at home and abroad.

AN INCREASINGLY INTERNATIONAL outlook, but with plenty going on at home, these are busy times indeed for Kuwait's national energy champion.

Kuwait Petroleum Corporation (KPC) is at the heart of expanding and modernising the nation's oil and gas sector, both upstream and downstream, across its various subsidiaries, which span all areas of the energy chain. It is underpinned by KPC's ambitious 2030 growth strategy, that includes overseeing a massive spending roll-out over the next few years.

Upstream, there is an ambitious plan underway to expand oil production capacity to four million barrels per day (bpd) by 2020, while downstream and refining capacity are also being boosted too.

“KNPC is currently building the Middle East's largest oil refinery at Ras al-Zour”

According to some estimates, total expenditure across the nation's energy sector for the next five years is projected to amount to around US\$112bn, although it could well be higher.

Key themes include integration and diversification, as Kuwait seeks to get smart with its natural resources, working alongside foreign partners and investors, and embracing new technologies.

Subsidiaries

And KPC's many subsidiaries are making it all happen on the ground.

The broad strategy includes the clean fuels project, with Kuwait upgrading its refinery infrastructure to produce state-of-the-art new eco fuels for local use and export.

Kuwait National Petroleum Co (KNPC) is currently building the Middle East's largest oil refinery at Ras al-Zour, with a processing capacity of 615,000 bpd.

The project's value is estimated at around US\$11.5bn making it one of the single biggest in Kuwait today.

It has provided huge work opportunities for contractors. In one recent award, Italian engineering firm Saipem was tasked by Kuwait Oil Company (KOC) to build a 450 km pipeline system for the new refinery, in the south of Kuwait, worth US\$850mn.

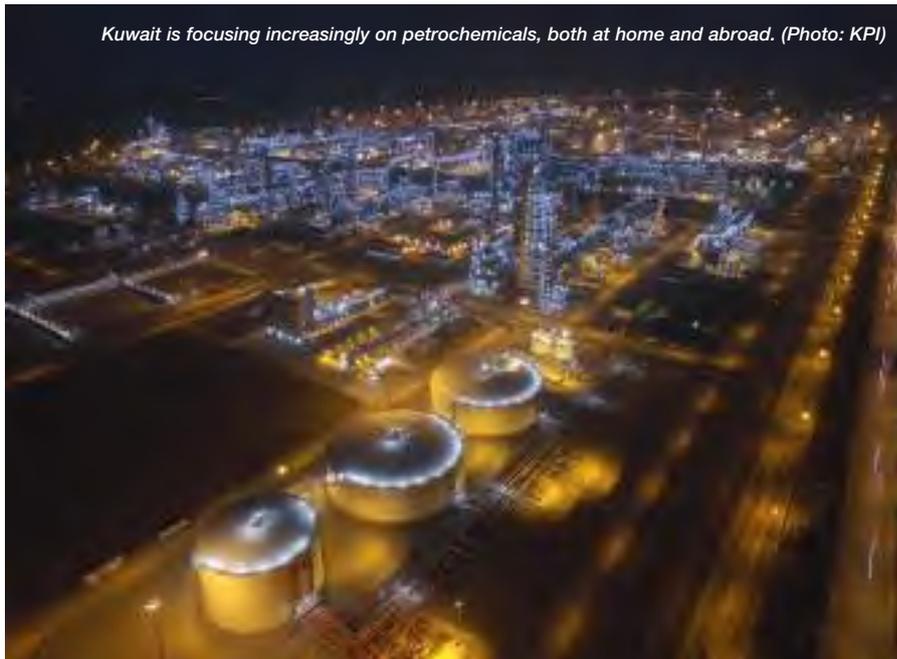
Other major downstream players undertaking new projects include Petrochemical Industries Company (PIC) and EQUATE Petrochemical Company. Earlier this year, it was reported that PIC plans to more than triple its olefins and aromatics production capacity from the current five million mt/year to 16 mn mt/year by 2030, as well as looking to increase investments overseas.

Upstream, KOC, arguably KPC's flagship subsidiary, is getting to grips with a host of projects, in addition to the management of long-term producing assets such as the mighty Burgan field and the northern Ratqa field.

Other upstream projects in Kuwait include the resumption of production with Saudi Arabia from the jointly operated oilfields, mainly Khafji and Wafra, in the Neutral Zone that sits between both countries.

Khafji was shut in 2014 for environmental reasons and Wafra has been shut since 2015 due to operating difficulties, with officials seeking to resolve issues since then, including the challenge of market volatility and a possible glut of oil. The Khafji field – operated by Al-Khafji Joint Operations Co, a joint venture between Kuwait Gulf Oil Company and AGOC, a subsidiary of Saudi Aramco – had been producing up to 300,000 bpd until its closure.

Kuwait is focusing increasingly on petrochemicals, both at home and abroad. (Photo: KPI)





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The Wafra field has an output capacity of around 220,000 bpd of heavy crude.

Technology

Just like the evolution of Kuwait's downstream refining and petrochemicals industry, drawing in new technology to create more advanced fuels, there are changes taking place upstream as well.

Last year, Kuwait began operating its first-ever solar power plant at the Umm Gudair oilfield, a development that could hold further implications for the sector, and for KPC.

The US\$100mn project, Sidrah 500, can produce 10 megawatts of electricity, half of which is supplied to the state power grid, the other half to supply the oilfield itself, which is owned by KOC.



Kuwait has begun operating its first solar power plant at the Umm Ghudair oilfield. (Photo: snv/Adobe Stock)

“Technology in all forms will play a pivotal role in KPC's expansion”

While numerous solar projects have taken off across the Gulf, it is a step forward not only for Kuwait, but also a landmark in the delivery of power services to an upstream oil field, all at a time when the region is keen to diversify its energy sources to meet fast growing local demand.

Indeed, on a wider level, technology in all its forms will play a pivotal role in KPC's expansion and upgrade of the energy sector from now on.

Industrial giant Honeywell is set to host an inaugural Honeywell Technology Summit in the country in early October, held under the patronage of KNPC, in part, a reflection of this trend.

“Technology and human capital are the key driving force behind Kuwait's ambition to further develop the oil and gas industry

as part of Kuwait Petroleum Corporation's 2030 strategy,” said George Bou Mitri, president, Honeywell Kuwait, Iraq, Jordan, and Lebanon.

International profile

Overseas, KPC is increasingly active too across multiple territories via its various subsidiaries.

Upstream, that includes the Kuwait Foreign Petroleum Exploration Company (KUFPEC) subsidiary, which recently acquired an additional 15 per cent interest from Total in Norway's Gina Krog field, doubling its overall equity holding.

Downstream, Kuwait Petroleum International (KPI) manages fuel sales in a range of countries, including across western Europe.

But more could be on the way. KPC announced recently that it is currently thinking of establishing a new commercial subsidiary to further market its petroleum derivatives.

Once approved, the new company will focus not oil market speculation but

instead on increasing added value to KPC's own products, according to Imad Abdul Kareem, acting managing director for global marketing.

KPI also recently announced its first shipment of crude to Vietnam's new Nghi Son Refinery and Petrochemicals Complex, in preparation for the start of operations.

The refinery, which is affiliated with KPI, has a processing capacity of around 200,000 barrels of Kuwaiti crude a day.

The project achieves one of KPC's strategic goals to provide a safe long-term outlet for the sale of Kuwaiti crude.

KPI owns a 35.1 per cent share in the project, alongside PetroVietnam, Japan's Mitsui and Idemitsu Kosan.

What seems certain is that there is more business in the pipeline, as Kuwait continues with the revival of its energy sector and seeks to assert itself abroad. That's positive news for the country and for all those contractors across the energy and technology spheres that have worked closely with KPC and its operating subsidiaries for decades. ■



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What future for the LNG market?

The LNG market is accelerating rapidly, but so is the expected supply, says Moin Siddiqi, economist.

THE GLOBAL GAS trade surged by 70 per cent between 2000 and 2016, rising from 620 billion cubic metres (bcm) to around 1,060 bcm, according to the International Energy Agency (IEA). Over this period the ratio between traded piped gas and liquefied natural gas (LNG) has changed noticeably. The former steadily lost share in global traded volumes to LNG; the latter's share of trade rose from a quarter in 2000 to one-third by 2016, with piped gas falling from 77 to 62 per cent during the reported period. BP projects that the global LNG market will expand seven times faster than the pipeline gas trade and will account for half of global traded gas up to 2035.

Global demand for natural gas is expected to increase by two per cent a year between 2015 and 2030 – versus four to five per cent for LNG – fuelled by robust consumption in several emerging markets led by China and India. The IEA anticipates LNG trade to reach 460 bcm by 2022. However, projected demand growth is not enough to absorb the predicted 650 bcm of total liquefaction capacity online that year, hence the 'supply glut'. Switzerland-based Vitol, the world's largest independent oil trader, expects the market to remain "significantly oversupplied" for the next five years, but adds that pressure on LNG prices is creating new markets, as well as raising demand among existing importers.

Demand side

By 2022, global LNG export capacity is forecast to grow by 160 bcm as the second phase of expansion gets underway. The IEA envisages annual LNG demand rising by 1.5 per cent until 2021 – adding 340 bcm of consumption over a five-year period. The club of LNG importers has grown from only 10 in 2008 to 38 countries by 2016. Japan, South Korea and China accounted for over half of global 2016 LNG imports of 346.6 bcm (BP figures). New importers are Caribbean countries, Egypt, Jordan, Pakistan and Poland. As of June 2017, 29 onshore LNG regasification terminals with total capacity of 117.7 bcm were under development – of which China and India accounted for five each.

LNG demand growth is helped by lower fuel prices, environmental directives to use less polluting coal in power generation and the adoption of floating storage and regasification units (FSRUs) technology. FSRUs can be leased and have lower capital costs compared to LNG terminals. Last year, around a tenth of global regasification capacity was reportedly offshore, and its share will increase. Petroleum Economist commented, "The end of the glut is already visible. Cheap, abundant supply and the battle against climate change should lay the seeds of demand growth in future – in maritime shipping, long-haul-vehicle fleets, in power generation and across developing energy-hungry nations."

Upcoming projects

New global supply will increase by more than two-fifths by 2020 to 455mn tonnes/year versus 2015 as LNG construction projects in Australia, the USA and Russia, costing over US\$250bn, come online,

Table 1: Top 10 LNG exporters (2016)

Country	LNG export volumes (Bn cm)	Natural gas production (Bn cm) *	Proved natgas reserves Trillion cm *
Qatar	104.4	181.2	24.3
Australia	56.8	91.2	3.5
Malaysia	32.1	73.8	1.2
Nigeria	23.7	44.9	5.3
Indonesia	28.2	69.7	2.9
Algeria	15.9	91.3	4.5
Trinidad & Tobago	14.3	34.5	0.3
Russia Federation	14.0	579.4	32.3
Oman	10.6	35.4	0.7
Papua New Guinea	10.4	N.A.	0.2
Total	310.4	1,201.6	75.2
(%) of World Total	89.5	33.8	40.3

* 2016 figures; gas output excludes gas flared or recycled.
Source: BP Statistical Review of World Energy 2017.

Table 2: Projected LNG export capacity & utilisation rate

Year	Export capacity (Bn cm)	Liquefaction capacity utilisation rate (%)
2015	415	93
2016	451	92
2017	490	91
2018	540	89
2019	560	91
2020	590	92
2021	600	93

Source: IEA Medium-term Gas Market Report 2016

according to Moody's Investors Service. As of June 2017, there was 139.4 bcm of new liquefaction capacity under construction globally, three-quarters of which is located in the USA and Australia. In 2016, eight projects (including brownfield) were brought online with annual capacity of 48.8 bcm. This year, 43.9 bcm of new additions to global supply are due online from Australia, the US, Russia, Malaysia, Indonesia and Cameroon.

The US shale gas boom has enabled the country to rapidly boost LNG liquefaction and exports. Nameplate capacity from six projects currently under construction is expected to increase by 1.4bn cubic feet per day (cf/d) in 2017, 1.9bn cf/d in 2018 and 3.8bn cf/d in 2019. Once six projects are fully operational, the USA should hold the world's third-largest liquefaction capacity at 9.4bn cf/d, after Australia and

Qatar, according to the Energy Information Administration (EIA) – the statistical arm of the US Energy Department.

Australia – endowed with relatively modest gas reserves of 3.5 trillion cm – is poised to become the globe's biggest LNG producer/exporter with annual liquefaction capacity of 118 bcm by 2018 (IEA figures), ahead of Qatar. The Gorgon LNG plant with a capacity of 21.2-bcm/year (Trains 1-3) is among the world's largest and most expensive hydrocarbon projects (costing US\$53bn), which is now fully operational. Wheatstone LNG and Ichthys LNG are the next facilities due online in 2018 – with a price tag of US\$34bn each. Additionally, the world's first mega floating liquefaction facility (Prelude FLNG) is under construction – installed with 4.9 bcm/year capacity that may cost sponsors around US\$11bn. Coalbed methane reserves in Queensland will provide feedstock for most projects.

New FIDs

Meanwhile, falling Asian spot LNG prices – down by two-thirds since their 2012 peak to US\$5.85 per million British thermal units (Btu) in April 2017 – alongside persistent oversupply, are discouraging project final investment

Table 3: Major LNG projects under construction (as of June 2017)

COUNTRY	PROJECT	Annual capacity (Bn cm)	Main investors	FID year	First cargo
USA	Freeport LNG (T2-3) *	12.6	Freeport, Macquarie	2014	2019
	Sabine Pass (T3-4) *	12.2	Cheniere Energy	2013	2017
	Corpus Christi LNG (T1-2) /	12.2	Cheniere Energy	2015	2019
	Cameron LNG (T1-2) /	12.2	Sempra Energy	2014	2018
	Dominion Cove Point LNG /	7.1	Dominion	2014	2017
	Freeport LNG (T1) /	6.3	Freeport, Macquarie	2014	2018
	Cameron LNG (T3) *	6.1	Sempra Energy	2014	2019
	Sabine Pass (T5) *	6.1	Cheniere Energy	2015	2019
Australia	Ichthys LNG (T1-2) /	12.1	Inpex, Total	2012	2018
	Gorgon LNG (T3) *	7.1	Chevron, Shell, ExxonMobil	2009	Mar 2017
	Wheatstone LNG (T1) /	6.1	Chevron, Woodside, KUFPEC #	2011	2017
	Wheatstone LNG (T2) *	6.1	Chevron, Woodside, KUFPEC #	2011	2018
	Prelude Floating (FLNG) /	4.9	Shell, Inpex, Kogas	2011	2018
Russia	Yamal LNG (T1) /	7.5	Novatek, Total	2013	2017
	Yamal LNG (T2) *	7.5	Novatek, Total	2013	2018
	Yamal LNG (T3) *	7.5	Novatek, Total	2013	2019
Indonesia	Tangguh LNG (T3) *	5.2	BP	2016	2020

Kuwait Foreign Petroleum Exploration Company; * Brownfield project (investing in existing facilities); / Greenfield project (constructing new LNG facilities), Source: IEA, Gas Market Report 2017



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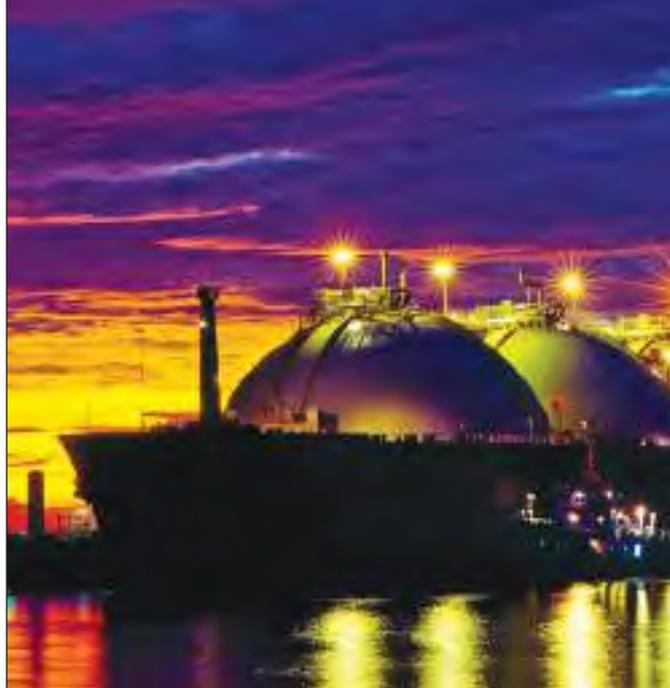
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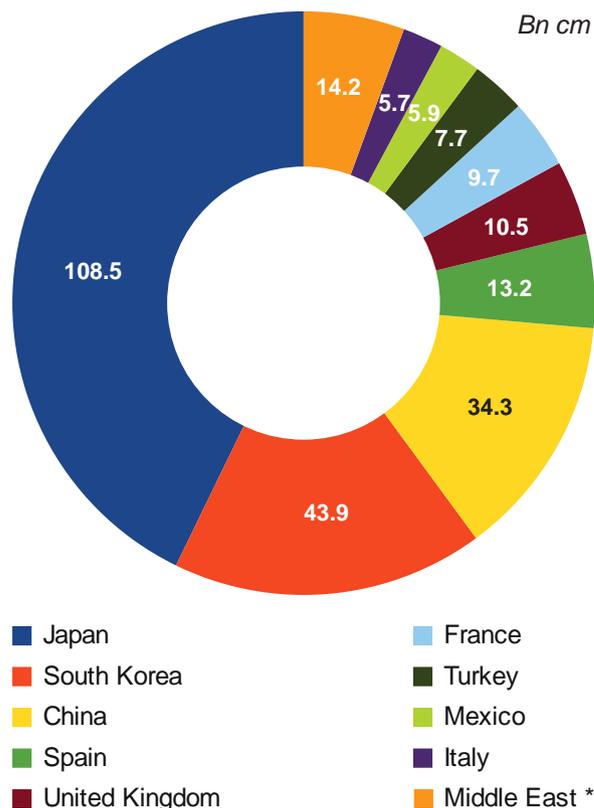
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Fig 1: Key global demand hubs, 2016

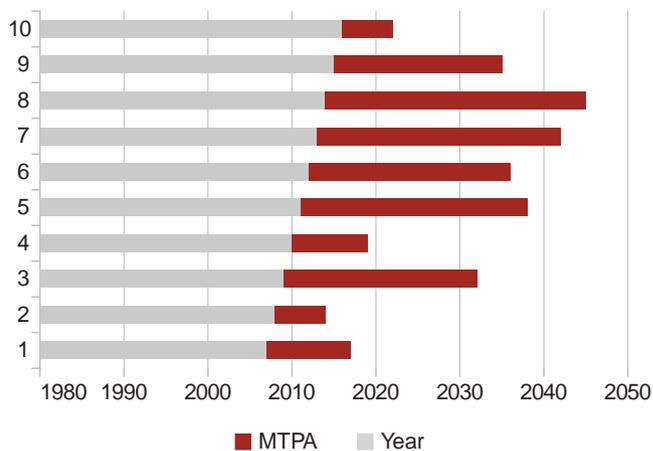


*Includes: Bahrain, Jordan, Kuwait & UAE

Source: BP Statistical Review of World Energy 2017

decisions (FIDs), especially on greenfield developments. FIDs on fresh capacity have declined from a yearly average of around 35 bcm over 2011-14, to around 25.9 bcm (four projects) in 2015 and just 8.6 bcm (two projects) in 2016, the lowest approval since 2006, according to energy consultancy Wood Mackenzie. During the first half of 2017, one FID was taken by ENI for the Coral floating (FLNG) facility in Mozambique, with nameplate capacity of 4.5 bcm/year.

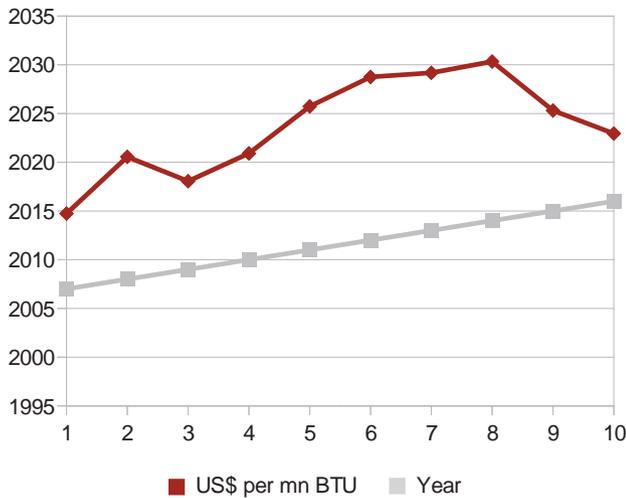
Fig 2: Overview of project FIDs



MTPA= Metric tonnes per year

Source: Wood Mackenzie data Q4 2016

Fig 3:LNG prices, Japan CIF



CIF= cost+insurance+freight (average prices)
 BTU= British thermal unit

Source: BP Statistical Review of World Energy 2017

In sum, Moody's thinks the market will not rebalance until the early years of the next decade, when global demand and LNG import infrastructure catches up with supply. Beyond the mid-2020s, investments in new trains are needed to meet growing demand by 2030 – otherwise a tighter market could emerge. ■

Footnote: LNG is natural gas cooled to about -260 °F in a liquid state, transported by specially designed tankers, then regasified at a receiving terminal and injected into existing delivery pipeline networks. It contains virtually zero sulphur emissions, plus lower particulates and nitrogen oxide emissions, compared to heavy fuel oil. The shift to low-carbon fuels in the bunkering and transportation markets favours increased LNG use. The 170 members of the International Maritime Organisation have agreed a sulphur limit in shipping fuel of 0.5 per cent from 2020 versus 3.5 per cent specification for bunker fuel today.

LNG helps reduce well-to-wheel emissions compared to conventional fuels and offers a cleaner/cheaper alternative to diesel in the heavy-duty vehicle market. Shipping rates represent the largest component in the transportation cost of LNG. As of early 2016, there were 449 LNG tankers operational worldwide. Shipping rates have remained on a downward trend in recent years due to oversupply.

Brisk LNG demand

The Middle East (including Algeria, Egypt and Libya) holds almost half of global gas reserves, mostly untapped, yet the volume of LNG imports into the region is rapidly rising as domestic demand exceeds piped gas supply. Within the past three years, LNG imports in the Middle East have surged 380 per cent against relatively saturated markets in other key energy demand hubs (notably Japan and South Korea), according to the Gulf Intelligence LNG Whitepaper (March 2017). Regional LNG buyers are Egypt, Jordan, Kuwait, Bahrain and the UAE.

“The Middle East needs a comprehensive and robust infrastructure network to build a world-standard gas hub and meet demand across the region,” said Hatem Al-Mosa, CEO,

Sharjah National Oil Company. The IEA expects Middle East gas demand to nearly double by 2040. Last year, natural gas consumption in the region was 603.6 bcm – equivalent to 17 per cent of the global total (BP figures).

The Oxford Institute of Energy Studies notes that ME LNG off-take rose from five bcm in 2014 to 24 bcm in 2016. Apicorp, Saudi-based investment bank, estimates that Middle East countries need to invest US\$10.3bn in LNG-importing facilities over the medium-term to cope with booming demand. London-based Energy Aspects consultancy predicts that Middle East LNG imports will reach 13.4mn tonnes/year in 2018.

In 2016, the Middle East was the world's largest exporting region, shipping 138.4 bcm of LNG – equivalent to two-fifths of global exports (BP figures). Qatar, with a liquefaction nameplate capacity of 105 bcm, comprised around one-third of global LNG trade. Recently, Qatar Petroleum announced plans to increase natgas production dramatically from its huge Persian Gulf 'North Field' which, if followed through, could boost Qatar's nominal LNG capacity in future years.

Other LNG exporters in 2016 were Algeria (15.9 bcm), Oman (10.6 bcm), and the UAE (7.4 bcm). Yemen LNG, with a capacity of 9.1 bcm, went off-line in April 2015 due to the country's civil war; Total (the operator) closed the plant. Thus far, the largest regional consumers (Iran and Saudi Arabia) have no plans for building either LNG production or importing facilities, though both possess vast proved gas reserves of 33.5 and 8.4 trillion cm respectively.

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As refining and chemicals projects increase in size and complexity, ABB's solutions are helping operators to reduce costs while maintaining safety and production efficiency. Colin Ward, senior VP Chemicals & Refining, ABB, speaks exclusively to *Oil Review Middle East*.

What are your views on prospects for your chemicals and refining business in the Middle East?

Increased supply and decreasing demand growth derailed an extended period of high prices, and the industry is now facing what appears to be an extended period of low oil prices. However, the global downstream market is taking mighty strides towards a perpetual recovery and assertive development, mainly on the back of developing economies, which include the Middle East. With the dramatic price drop there is a need to ensure that chemical and refining operators are doing everything within their power to increase efficiency and boost their slender profit margins.

In the Middle East, uptake of new technology for the downstream sector is admirable. The region is ahead in the technology curve and is hungry for the implementation of the latest technology. The best example is Sadara, a joint venture developed by the Saudi Arabian Oil Company (Saudi Aramco) and The Dow Chemical Company (Dow) in October 2011. With an investment of over US\$20bn, Sadara is poised to change the game in the Middle East's chemical industry.

According to McKinsey, total net additions of distillation capacity out to 2020 are forecast at 9.4mn bpd globally. This is equivalent to a 1.6 per cent annual growth rate in global capacity, versus a 10 year historical rate of 1.2 per cent. New greenfield refineries, particularly in Asia and the Middle East, continue to provide the largest part of this growth. For instance, Saudi Aramco Total Refinery & Petrochemicals Co., a joint venture between Saudi Aramco and Total, started shipments from the 400,000 bpd Jubail refinery in September last year. This is just one of the three such massive facilities planned by the Kingdom. Other Middle Eastern oil producing countries are also adding refining capacities, including the UAE, Kuwait and Oman. According to IHS Analysis, SABIC and



Colin Ward, senior VP Chemicals & Refining, ABB

ExxonMobil Chemical, meanwhile, are investing US\$3.4bn to build a rubber and elastomers complex that will introduce ethylene propylene diene monomer rubber, polybutadiene rubber, and carbon black production to Saudi Arabia.

“ In the Middle East, uptake of new technology for the downstream sector is admirable ”

How do you plan to grow your business in the Middle East region, and how are you helping operators to cut costs?

A modern oil refinery can process several hundred thousand barrels of crude oil a day,

and must operate continuously for months and years at a time. This is made possible by utilising leading automation and electrical systems that operate thousands of separate plant items to perfect a chemical process; separating the hydrocarbon molecules into fuels, lubricants or the feedstock for further petrochemical techniques.

Automation is the first step in a journey towards a new generation of ultramodern, high tech refineries and petrochemical plants that will breathe new life into the downstream industry, dramatically sharpening its competitive edge. It will allow for far better integration across the full spectrum of the downstream sector. The exacting requirements of the industry include productivity, efficient utilisation of resources, quality and safe work environment, modular solutions, scalable DCS and minimal adverse effects on the environment.

Projects in the chemicals and refining segment are so massive and complex that they normally result in time and cost overruns. With our 'Intelligent Project' approach which combines 'Intelligent Engineering' and 'Intelligent Infrastructure', ABB shortens schedules, cuts costs and minimises risks. ABB has more than 50 years' experience in providing the power, control and safety systems that make all of this possible, and the leading experts to operate and optimise the process.

The aim is to make the plant as safe, energy efficient and reliable as possible. ABB technologies cut an operator's capital costs by 20 per cent and its operating costs by up to nine per cent. This is done by bi-directional integration with Intergraph's SmartPlant Instrumentation and Electrical which reduces total engineering costs by 25 per cent. Furthermore ABB as a MAC/MEC (Main Automation Contractor/Main Electrical Contractor) of the project can reduce CAPEX costs by 20 per cent. Also worth mentioning is ABB's Advanced Process Control, which reduces OPEX costs between three and nine per cent.



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- Maintain safety

ABB is continuing to innovate and introduce new technologies. We are working on the 'facility of the future' together with our customers, to look at all aspects of where our technology is going to be, where our customers' needs are going to be, and how those two things will intersect in the future.

Process Power Management is a software solution that helps energy-intensive industries to optimise the way electricity is generated and distributed around their plants. ABB Ability™ System 800xA is a secure way to connect our customers to the power of the Industrial Internet of Things and, through our services and expertise, to go further by turning data insights into the direct action that

ABB, as the MAC for the Sadara project, is responsible for all aspects of the supply of the integrated process control and safety systems (IPCS) including design, fabrication, procurement, configuration, programming, integration, inspection and quality assurance, functional and performance testing and documentation. ABB is supplying 18 800xA-based IPCS to Sadara that will control different manufacturing plants – a total of over 150,000 I/Os; cabinets for the control systems which are being assembled in Sugarland, USA, India and Saudi Arabia; a huge fieldbus foundation which will be ABB's biggest fieldbus foundation in the world; 260 redundant controllers; 450 servers; 260 workstations; and 40 operator consoles across five operator buildings. The six sq km site features 26 integrated, world-scale manufacturing plants that will produce a total of over three million metric tons of high value added plastics and chemical products each year.

The largest crude oil refinery in Turkey, the STAR (Socar Turkey Aegean Refinery) refining plant has been powered by ABB which includes the complete electrical transmission and distribution system for the new plant and ensures reliable supply of high-quality power for critical processes to ensure productivity and efficiency. We are leveraging advanced technologies from across ABB, and our extensive system integration capabilities, to deliver this complex project and support the operation of this important new refinery, which is being built on Turkey's Aegean coast and will supply fuels, and feedstock for petrochemicals production.

For a Far Eastern refinery, ABB's predict and control, state space multivariable controller, combined with ABB's inferential

modelling platform, was used to tightly control the process units. This resulted in an increase of three per cent to nine per cent profitability.

ABB, as the MAC, provided the turnkey single point responsibility to install and commission the complete gasoline blending system for a European refinery. The scope included the FTNIR analyser, analyser models, offline and online optimisation, instruments, valves, blend header, composite sampler, prototype fuel tanks, additive systems, etc. The captured benefit was several million dollars per annum return.

How are disruptive technologies transforming the refining and chemicals business, and what key benefits of ABB solutions would you like to highlight?

Integrated engineering and operations have paved the way for digitalisation in the chemical industry. Businesses large and small will only succeed at generating significant value from these technologies if they can apply abstract data analysis to their daily operations efficiently, consistently and continuously. Among the key drivers are the increased availability of data, ubiquitous connectivity between and among machines and people, and the exponential growth in processing power.

Against this backdrop, ABB is demonstrating how the concepts of automation and digitalisation can be applied to chemicals and refining operations to make them more efficient and productive by significantly reducing costs, schedule and risks. By combining ABB's deep domain expertise with network connectivity and the latest digital technologies and innovations,

“ ABB technologies can cut an operator's capital costs by 20 per cent and its operating costs by up to nine per cent ”

generates customer value in the physical world. The ABB Ability™ System 800xA collaboration platform and its built in functionality will allow the end user to tackle money saving initiatives and implement productivity enhancing solutions for a fraction of the cost of adding third party software and hardware. In addition to alarm management, advanced control, video systems, safety, electrical integration and power management there are a host of other embedded capabilities in the platform. It has over 10,000 installations world-wide in over 100 countries, monitoring and controlling over 50 million tags, 30 per cent of which are installed in the chemical and refining industry.

How important is the collaborative process, and do you have a preferred model for engaging with your customers?

We are working closely with our customers to deploy efficiency programs to improve their competitiveness, with a focus on delivering as efficiently, cost effectively, and as safely as possible.

The key elements are:

- Strengthening early phase involvement – concept and FEED
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In the current market environment, it is critical to effectively integrate power and automation, which results in CAPEX and OPEX savings. Our integrated EICT solutions, combining engineering, consulting, products and services, permit a reduction of CAPEX by 20-30 per cent with two to three months improved delivery time. ABB has introduced new offerings to support the drive for cost reduction and production efficiency improvement. An example is ABB's 100 day challenge – advising operators how they can reduce costs while maintaining (or improving) safety and production efficiency – and starting to see benefits within 100 days.

Predictive maintenance/condition monitoring can bring about annual savings of US\$4mn. ABB's approach towards plant maintenance is to provide an environment where information is transparently accessible to users in both the process control system and the maintenance system environments, regardless of where the information has originated.

How do ABB solutions enhance health, safety and security?

Most plant operators process vast amounts of data to help manage their operations and meet safety requirements. Industry research



ABB solutions can help operators to maintain health and safety standards

shows, however, that most are unable to meet all of their safety management needs, such as testing, adequate process hazard analysis (PHA), safeguards, etc. Those companies operating in high hazard industries should be able to answer the following three questions:

1. Do you understand what can go wrong?
2. Do you know what systems are in place to prevent it from occurring?
3. Do you have information to assure yourself that these systems are working?

Answering these three questions not only reduces operating safety risk, but also enables increased operating uptime and supports the identification of opportunities to reduce the maintenance burden. Meeting the safety challenge and answering these three questions requires organising and analysing vast amounts of data from traditionally siloed systems and relating this data to original

design assumptions. This often requires significant manual effort, which is difficult and is prone to inaccuracies as well as inconsistent and incomplete records, all of which can lead to poor management decisions.

ABB Ability™ solutions for chemicals and refining encompass 'Intelligent Infrastructure', safety instrumentation, digital switchgear, protective relays, alarm insight, safety insight, operations insight, asset insight and safety consulting services. It provides a digital platform that collects engineering data from low-cost sensors across all phases of work and traditional siloes, and then aggregates and analyses the information to support near real-time decision-making. This scalable solution enables the operation and maintenance teams to plan for, and take corrective action, to maintain health and safety standards. ■

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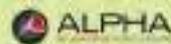
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Serving the region's need for maritime arbitration

Majid Obaid bin Bashir, vice chairman and secretary general, Emirates Maritime Arbitration Centre (EMAC), discusses the role and activities of the Centre, which provides arbitration and mediation support to maritime stakeholders.

How do you view prospects for the growth of maritime activity in the region, and do you have any comment on oil and gas related activity?

The region has a long-standing maritime legacy and the UAE's geographical location makes perfect sense for the strategic development of a world class maritime infrastructure to advance this vital trading corridor between East and West.

Whilst the oil and gas sector is affected by geo-politics and the fluctuations in trading activity, the carriage of these cargoes continue to flow despite the overhang of tonnage in most vessel classes amidst cyclical trading patterns.¹

The UAE has been able to capitalise on its positive reputation to attract major international shipping companies to the region. According to a survey conducted by Menon Business Economics², when industry leaders were asked which cities they considered the world's top shipping centres, Dubai ranked 10th. The criteria included indicators such as infrastructure; maritime finance and law; ports and logistics; maritime technology, competitiveness and attractiveness.

The Emirates Maritime Arbitration Centre (EMAC) is an impartial maritime centre with the primary objective to provide sound support for disputes arising within the offshore oil and gas sector, and ensure our panel has the expertise and know-how needed to support this.

What was the rationale behind the establishment of the Emirates Maritime Arbitration Centre (EMAC)?

The flow of international trade relies heavily on the transport of goods by sea. Maritime business in general has weathered many political and economic challenges over the last few years, and yet, continues to take significant strides towards technological and service improvement. Today, most maritime experts are looking at maximising returns and cutting costs without impeding quality or efficiency. The strength of maritime relies on the willingness of key players from around the world to come together and encourage further innovation and development.

This is where the UAE, and notably Dubai, has put together a Maritime Sector Strategy encompassing best practices for ship repairs, port facilities, bunkering, legal services and a whole range of maritime related facilities, positioning itself as a major contributor to the growth and development of the sector.



Majid Obaid bin Bashir, vice chairman and secretary general, EMAC

In response to the changing dynamics of the region's maritime sector, the need for a specialised dispute resolution centre was warranted, to put in place alternative forms of dispute resolution which offer a more efficient and cost-effective way of resolving maritime disagreements. The call for a sector specific arbitration centre was answered with the establishment of the Emirates Maritime Arbitration Centre (EMAC) in April 2016, with a formal launch of its services in November of the same year.

Conveniently located in the heart of Dubai, in the Dubai International Financial Centre (DIFC), EMAC provides arbitration and mediation support to maritime stakeholders. EMAC's arbitration rules are based on the UNCITRAL 2010 rules, which allow for a light touch to ensure its success and speed of dispute resolution. In addition, these rules provide for emergency and fast-track arbitration, meeting market demand and addressing the sector's need for expedited and efficient services.

What arbitration services does EMAC provide, and what are the advantages of using its services?

Arbitration is a flexible, consensual process for resolving business disputes in a binding, enforceable manner. Given the international

“ In response to the changing dynamics of the region's maritime sector, the need for a specialised dispute resolution centre was warranted ”

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nature of maritime, arbitration offers an efficient and effective cross-border resolution process, allowing businesses to continue their day-to-day operations with minimal disturbance.

EMAC offers timely, cost-effective and efficient dispute resolution services for the entire region. Today, EMAC, as the Middle East region's only specialised maritime arbitration centre, fills a geographical gap and plays an active role in connecting legal and commercial professionals from around the world.

The Centre has issued its own set of arbitration and mediation rules, founded on the UNCITRAL 2010 rules. EMAC's rules are in-line with modern trends, reflecting best international practices, and are designed to be flexible and respect the requests of disputing parties. They give disputing parties the freedom of choice to select the governing law and jurisdiction for their hearing, the absence of which will see the DIFC as the default seat for arbitration. Furthermore, the rules cater for fast track arbitration to meet the expedited demands of the sector.

EMAC provides light touch case management support through a professional case management team, supervised by highly qualified members of an executive committee.

How do you think EMAC will contribute to growing the UAE's position as a centre of excellence for maritime arbitration?

Arbitration is used globally as a faster, more private way to end disputes, compared to resolutions through litigation. The launch of EMAC is part of an overall strategy for creating a regional maritime

“EMAC is also committed to cultivating the next generation of arbitrators”

services cluster within the UAE. In geographic terms, EMAC's central location between the better known arbitration centres of Singapore and London provides an unparalleled opportunity to fill a regional need.

As the only maritime arbitration centre in the region, EMAC brings together highly skilled professionals to support alternative resolution disputes. Through its central location and industry focus, EMAC is bringing confidence and credibility to a sector that aims to make a significant contribution to the country's economy.

What has the Centre achieved so far?

Since our launch in November 2016, we've worked to raise awareness of the Centre in the region and around the world. We participated in the Dubai Maritime Week Conference in 2016, and held a presentation for legal professionals in London in January.

Our representatives have participated in SeaAsia in Singapore, Nor Shipping in Norway and the IBA Maritime and Transport conference in Rio de Janeiro during the first half of 2017. We will also be presenting at ICMA in Copenhagen in September and attending ADIPEC in November. Embodying the global reach of the shipping industry, these introductions allow EMAC to ensure the global maritime industry has access to both regional and international arbitrators, mediators and experts.

In addition to our overseas efforts, EMAC is also committed to cultivating the next generation of arbitrators. During the first-half of 2017, EMAC representatives worked with Middlesex University Dubai to mentor the University's team for the 24th Annual Willem C. Vis International Commercial Arbitration Moot. Mentoring the team during the Middlesex University Dubai pre-Moot in March and the International Commercial Arbitration Moot in April, the experience not only provided Middlesex University Dubai students with the skills needed for moot, but also those skills needed in the professional space. The outcome of the team's experience during the Moot will be captured in a white paper format which will be presented at ICMA 2017, later this year.

Ensuring our ongoing commitment to foster the future of arbitration, EMAC will continue to partner with Middlesex University Dubai to hold the first EMAC Regional Moot in November. The aim of the moot is to give students a unique and valuable insight on international arbitration, through the lens of a regional perspective exercising the EMAC rules.

Are there any particular cases you would like to highlight?

EMAC is still in its infancy. Arbitration cases do take time to materialise. It begins at the conception of an agreement where contracting parties agree to incorporate EMAC's arbitration or mediation clause as a point of reference should a dispute arise. It is not an overnight development. By spreading awareness of the Centre's services we aim to encourage the maritime sector to select EMAC as their preferred Centre for resolving arbitration and mediation cases.

In our first year of operations, EMAC has made significant strides in engaging its beneficiaries through the media, sharing knowledge through themed seminars and its membership programme. The range of maritime beneficiaries who advocate the services of the Centre is proof the market is warming up to the fact that EMAC is ready and willing to provide top notch support. ■

¹OPEC Report 2017

²<http://www.menon.no/wp-content/uploads/2017-28-LMC-report.pdf>

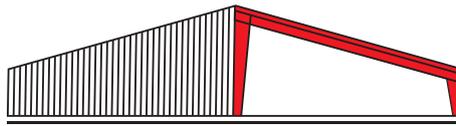
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Reaping the rewards

Sandra Antonovic, COO of crew transfer solutions provider Reflex Marine, discusses the company's strategy and operations in the Middle East.

What is your strategy for developing your business in the Middle East?

Reflex Marine and our products have been supporting offshore crew transfer operations in the Middle East for fifteen years now. Both our FROG-XT range, and our latest product WAVE-4 are a very good fit for all countries in the region. Defining and developing a strategy for any region inevitably includes understanding the wider geopolitical context, market volatility, currency fluctuations, and inevitably, the oil price trend. Having that context helps you define and deliver the strategy that improves, strengthens and facilitates the operations of your clients.

What has been your experience of working with the NOCs in the region? Has the focus on cost reduction had an impact on your business?

Working with NOCs in any region is always demanding, but it can be very beneficial, and not just in commercial and brand growth terms. Working with NOCs in the Middle East is about skill, expertise, patience, the ability to compromise and readiness to deliver the very best all the time. Working with NOCs in the region is also about understanding the culture and being accepted into it.

Middle Eastern countries traditionally have a low cost of oil production, and a lot of their efforts are put into keeping those costs down. This has always provided a great opportunity for Reflex Marine. Our personnel transfer carriers are the safest in the world, rigorously tested and with the widest operating envelope. Marine transfer by crane is also the most cost efficient crew transfer option. When you combine those features – safety, robust operating envelope and cost efficiency, you have a winning combination. If you do a good job in delivering it to the market, and if you keep your focus on improving the clients' operations and helping them solve their offshore logistics' challenges, you will have a strong position in the market. We continuously develop and improve our approach to the market, as much as we continuously develop and improve our products.

To what extent is the Middle East a springboard for expanding your business into the wider region?

The Middle East will always have a pivotal role in the global energy sector; whether we are talking about conventional sources of energy, or renewables. When we discuss Saudi Arabia, for example, we immediately think about oil reserves; we seldom think about solar or wind farms. Saudi Arabia has set ambitious goals for renewable energy, and is looking to invest around US\$50bn in solar and wind by 2023.

The Middle East does business in a very different way from the western countries, and success here is a good litmus test of how international your company really is; how adaptable and how client focused is your strategy; and how professional and sophisticated in their communication your market development team is.

What has been your experience of growing a business in the Middle East as a woman?

I grew up in a culturally and religiously diverse region in Europe, and have travelled a lot throughout my career. Adapting quickly comes very naturally for me. Still, when I moved to England five years ago I struggled a lot to feel comfortable within that mindset, way of life and view of the world. In comparison, moving to the Middle East was much easier for me, and I adapted quickly. I have spent time in Kuwait, Qatar, Oman and the UAE, and I have had very positive working relationships and experiences in all those countries.

Working in the Middle East is very much about substance, profound thinking and often finesse. I find that incredibly motivating and encouraging. It drives you to keep being the best version of yourself, both in how you respond to situations and how you do your job. It encourages you to find a balance between a very hands-on and a very academic approach. I learned a lot, and I keep learning. When I apply my learnings and experiences from the Middle East to other regions and parts of the world, the end result is even more rewarding. I am incredibly grateful for the experience. ■

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Mixed picture for oil and gas workforce

Andy Ryan, senior vice president Middle East at Airswift, says that the employment situation in the region's oil and gas sector remains positive, despite the challenges.

THE AIRSWIFT/ENERGY Jobline recent Global Energy Talent Index (GETI) revealed that the Middle East is the third most popular region for job seekers in the energy sector – behind only North America and Europe. The employment picture does have its challenges, but the mood remains buoyant.

The upside

A small local population, coupled with a wealth of energy resources, means that there

will always be openings for expatriate workers – even in countries with strict local content policies. Already, there is a wealth of opportunity available to local and expatriate workers in the Middle East's energy industry, with large capital development projects on the horizon that could provide jobs for up to 20 years. Sabic's oil-to-chemicals project and Saudi Aramco's integrated refinery and petrochemicals development, both at Yanbu on the Red Sea coast, are but a couple of examples.

Such ambitious development has left oil and gas workers in the Middle East feeling exceptionally optimistic. GETI 2017 revealed that 48 per cent of workers expect their salaries to increase or stay the same over the next 12 months, and with GETI 2018 open for responses it will be interesting to see whether this optimism was well-founded.

Interestingly, hiring managers were more cautious, with only a quarter expecting salaries to increase within the same time period. It's this more holistic view of the



industry that, in my opinion, gives the more accurate understanding.

However, you could argue that this disparity in expectation won't overly affect the workforce, as our research shows that remuneration isn't the primary motivator for those moving to the Middle East. The area's strength lies in its generous tax regimes and benefits packages that can include housing and schooling, and end-of-project bonuses.

The downturn has impacted some of these packages slightly, and we have seen plenty of evidence from clients on package reductions to support this. These include the likes of smaller bonuses and tighter health plans. However, many of the less experienced workers who are less accustomed to these benefits have not felt the difference too keenly and remain enthusiastic about the industry.

“ Such ambitious development has left oil and gas workers in the Middle East feeling exceptionally optimistic ”

The downside

But it's not all rosy. After all, most hiring managers don't expect salaries to rise, and reduced packages across the industry have made it harder for operators to retain an experienced workforce. These workers, who have been in the industry for decades, are finding it harder to acclimatise to the new, reduced, benefits packages. In addition, they are likely to feel the biggest comparative pinch because they are the highest earners. Some of this top talent is even transitioning over to other sectors such as the process and infrastructure industries, as these sectors offer comparable pay for higher job security.

Specifically, the industry in the Middle East also continues to suffer from skewed Western perceptions, deterring some people from moving their family due to safety and security fears. It's a shame, as this is almost entirely a misconception, but that doesn't change the fact that it's another recruitment challenge for local operators.

Taken together

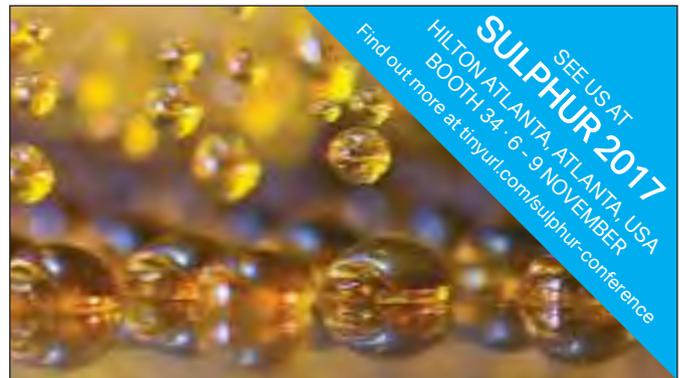
These two views of the industry, revealed by GETI 2017, may seem contradictory at first. On the one hand, the industry as a whole and the region in particular face continuing headwinds, yet the talent keeps following and remains largely undeterred.

Why? Well, despite everything, the positives definitely outweigh the negatives and the proof is in the pudding. Airswift's average hire per month into oil and gas in the Middle East has been between 25 and 30, and in Q2 of 2017 we have already made over 400 hires.

I can personally attest that, despite the myths, the Middle East is a fantastic place to live and make a career in the oil and gas industry. The optimism that runs throughout the GETI 2017 results tells me that many in the sector feel the same.

With GETI 2017 being the success it has been, this year's 2018 survey is even more ambitious. Not only will it build upon a number of last year's findings to assess the changing landscape, it will also set out to answer an additional set of questions – taking a deep-dive into the rise of automated technology and its potential impact on the future of energy workplaces. ■

The world's largest energy recruitment and employment trends report has now opened for 2018 responses. To take the survey, please go to <https://www.surveymonkey.co.uk/r/J8PY2MZ>.



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A reliable solution for perimeter protection

Network video camera systems offer a flexible, scalable and cost-efficient solution for perimeter protection, says Andrea Sorri, director Business Development, Government, City Surveillance and Critical Infrastructure, Axis Communications.

WHETHER ON A small, basic scale in a residential setting, or for a critical infrastructure facility, perimeter protection is important for the safety of residents and staff and to safeguard against trespassing, theft and vandalism.

Traditionally, perimeter protection measures relied on technologies such as short distance radar, lasers, ground sensors, motion sensors or motion-sensitive fence wires.

While these technologies all perform well, they have obvious and significant limitations: they do not let the operator distinguish between real and false alarms – and they provide limited detail. For every alert triggered, a person has to inspect the area in question to confirm if there is an actual breach of the perimeter, and a threat that needs to be dealt with. This is not only time consuming, but frequent false alarms – for instance, set off by a passing animal – can eventually lead to more lax security checks.

Recognising how important it is to address this, and to understand the nature of potential threats in real time, organisations are increasingly turning to network cameras to improve perimeter protection. Using live thermal video cameras as detection sensors and high definition video cameras to provide detail and verification, these solutions add important visual information about who or what has triggered the alarm, and about what kind of activity is going on.

“They can be set up to be as versatile and high performing as the setting requires”

In combination with traditional technologies, network cameras can be built into a more intelligent and reliable, IP-based surveillance system. With a vast range of



Andrea Sorri, Axis Communications

cameras available on the market, they can be set up to be as versatile and high performing as the setting requires. Even in difficult light or weather conditions, clear and crisp images on live and recorded video footage facilitate the detection and identification of objects, people and incidents. Automated solutions and video analytics software can further reduce the need for human intervention and monitoring staff.

Challenges and solutions

The main objective of any perimeter protection system is to detect a real threat or intrusion at the earliest possible stage – and to do this 24/7. However, the areas that need to be monitored can be vast – rail yards, bus depots, car parks, harbours or the area around an industrial site – and their sheer size can pose significant challenges. Lighting conditions can be a problem, especially at night time if there is little or no electric light available.

The combination of thermal cameras with intelligent video applications and pan/tilt/zoom (PTZ) dome camera has proven very effective in handling the protection of these sites in diverse environments.

Thermal network cameras do not need any light at all to operate and are an obvious solution to night-time monitoring. Even in broad daylight, they are useful in detecting people or objects that are obscured by complex backgrounds or deep shadows. The cameras available on the market today are so sensitive and accurate that they provide a perfect first line of defense. When equipped with intelligent video analytics, a thermal camera can be configured so that when it ‘sees’ a suspicious event, it automatically directs a second, PTZ camera to point and zoom in to the right place and provide live HDTV video of the situation.

Working in parallel, the two camera types form an extremely secure and accurate protection mechanism. To ensure uninterrupted recording and as much functionality as possible, each camera is independent and is able to provide information as long as it is connected to the IP infrastructure. In case of communication failure, the cameras can record onto an embedded SD card for future analysis.

Fast and appropriate action

An effective perimeter protection solution needs to provide both deterrence, and immediate visual verification. The real-time information delivered by network cameras allows security staff to take quick and appropriate action, as well as minimising false alarms. In case of an incident, communication is key: evidence can be collected and transferred to the relevant stakeholders by email, or as an alert on a mobile phone. Security managers can use their mobile phones to view live video from all their network cameras, or log on to the control room server to search recorded footage. The cameras can be set up to automatically trigger a response, such as floodlight or sirens, or network horn speakers can be used to issue verbal warnings.

The beauty of IP-based technologies is that they can be integrated with each other, and with existing security systems. Future-

proof, flexible and fully scalable, network cameras in combination with other sensor systems and technologies such as fence or buried cable detection can cater to the most complex of setups, such as critical infrastructure protection, where the security solution has to be able to effectively manage multiple alarms at once.

“ A video surveillance system can be largely automated, and very cost effective”

But neither technology nor price put network cameras out of reach for smaller businesses and even private homes. With integrated analytic software and other clever applications, a video surveillance system can be largely automated, and very cost effective. Capable of processing video information at the edge, inside the camera itself, modern units require less bandwidth and reduce the need for expensive



The areas that need to be monitored can be vast. (Photo: stnazkil)

storage. Even small and basic systems provide the high image quality required.

The versatility of network cameras, in combination with the many available video analytics applications, makes these systems

flexible, scalable and cost efficient. Cutting the effort, stress and problems caused by misinterpreted and false alarms will also pay dividends – if nothing else, in the form of greater peace of mind. ■

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An effective approach for security

Value for money and the ability to determine whether you are getting a quality service are key factors in selecting a security provider, says Simon Barry, managing director of Al Murabit Security Services.

SECURITY IS THE ultimate grudge spend, even in Iraq for some. The discussions can go on for ever: What is the value in security? How does security add value? And so on. The counter is always along the lines of working out the cost of not having security against the cost of security. The market, even in Iraq, is becoming more commoditised, which often leads to selection being made on the basis of bottom line item cost, rather than what it is needed for the job in the first place. The phrase “closing the stable door after the horse has bolted” comes to mind, based on a scenario where security has failed, after which resources are thrown at a problem that has already occurred. Prevention will always be better than cure, and more cost effective in the long run. The other analogy is the client who keeps asking a Jaguar dealer for a smart Jaguar, but says that he only wants to pay for a Trabant – he ends up with the Trabant!

Value for money and the ability to determine whether you are getting what you pay for and also whether that is a quality service, are the key drivers. The security industry is actually well regulated; more accurately, it includes companies who have voluntarily submitted to regulation. Those who have done so are committed to standards, not just in service delivery, but also across a greater spectrum that includes business ethics and human rights. Certifying bodies include UKAS, who are world renowned and trusted. This certification comes at a price, which is what hard-nosed clients often tend to ignore. Even large oil and gas companies will publicise their ethics policies and requirements for compliance, often ignoring the fact that ‘doing the right thing’ will always come at a cost for their service provider.

Duty of care actually means ensuring that people who are armed, and operating in areas where security can become a major issue, are effective at their job. You rarely get a second chance in a crisis, so getting it right first time is not just an option, it is the key to survival. Brains rather than brawn tend to get you out



Simon Barry, managing director of Al Murabit Security Services

of trouble in better shape. They can also help you to avoid getting into trouble in the first place. With regard to client care, especially in areas where fighting has not long ceased, the requirement is to get them to their task or meeting in perfect shape to enable them to achieve their goals, not unsettled by the activities of those who are supposed to be taking care of them.

The challenges facing people doing business in Iraq are constantly evolving. The solutions to yesterday's problems will not necessarily work with today's. An understanding of the environment, not just physical but also business and cultural, is key to making progress with the minimum amount of drama. Knowing who to talk to and what to

avoid really helps: the local knowledge and know how.

With margins being tighter, efficiency is the order of the day. Ironically, the drop in oil price has driven that, the other side of the ‘do it really cheap’ coin. The ‘do it really cost effectively’ principle is the way forward, combining quality with value for money; harder when margins are tight but certainly possible.

Oil and gas still make up much of the demand, but the post conflict reconstruction in Iraq and associated logistics and activities of organisations like the UN and NGOs, still require a form of security that enables them to work in high risk areas in order to make a difference to a long-suffering population. There is investment going into Iraq, but it is being more carefully managed than it was 12 years ago.

So, know your client, know your environment and use services that enable you to do your job with the minimum of risk and fuss. That in itself is value for money. It may be a cliché, but international standards combined with local knowledge and know-how are a powerful combination. ■

“ Prevention will always be better than cure, and more cost effective in the long run”



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The changing dynamics in LNG and the impact on planning

THE LNG INDUSTRY is changing, says Dennis Ostendorf, business unit director oil & gas, Qintiq.

“Planning and scheduling in LNG used to be fairly simple: production needed to be maximised and cargos were delivered to long-term customers based on a pre-agreed annual delivery programme (ADP). What we see more and more is a developing spot market which can yield much better prices for your cargoes than the long-term contracts. However, you can only reap these benefits if you either have over-capacity (beyond the long-term contracts) or if there is flexibility in the long-term contracts to divert the pre-agreed cargoes,” says Ostendorf.

“This brings a new dimension to the LNG planning puzzle, namely, how can we deliver to this new spot opportunity, what benefits can we reap from it, and what are the costs of committing to the delivery?”

“At first glance this may seem like an easy puzzle to solve. Simply compare the revenue of the to-be-diverted pre-agreed cargo and compare it with the potential revenue of the spot opportunity. Then you take into account any penalties that may arise and perhaps even the difference in logistics cost for the delivery. The



results of these considerations will determine if the spot opportunity is a valuable one.

“In practice however, things are more complicated. If lifting dates are not the same, inventory issues may arise. These issues are also likely if the volumes of the diverted cargo and spot opportunities are not the same. You also need to consider the consequences of disruptions arising from taking advantage of a spot opportunity: what if your carrier cannot be back in time for the next cargo to lift? What is the knock on effect on your ADP?”

“In order to solve these issues, simple one-to-one diversions do not always suffice. In order to maximise the benefits, you need to have full insight into both the economics and the logistics side of the business.

“An integrated planning software – accessible to both marketing and planning – can give you this insight. Combined with a powerful optimiser, the right solution enables creative solutions to get the best out of your spot opportunities, while still adhering to your long-term commitments.”



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KOGS 2017
Date: 15-18 October
Venue: Kuwait International Fair

Society of Petroleum Engineers
2017 KOGS
3rd Kuwait Oil & Gas Show and Conference

Shaping the future of energy

As the oil and gas business begins to rebound, the 3rd Society of Petroleum Engineers Kuwait Oil & Gas Show and Conference (KOGS) is poised to be the single biggest gathering of the oil and gas industry ever seen in Kuwait.

THE COMBINED CONFERENCE and exhibition will take place from 15–18 October 2017 in Kuwait under the patronage of His Highness Sheikh Jaber Mubarak Al-Hamad Al-Sabah, Prime Minister of the State of Kuwait, and is supported by the Ministry of Oil, State of Kuwait, Organization of the Petroleum Exporting Countries (OPEC), and Kuwait Petroleum Corporation (KPC).

Organised by the Society of Petroleum Engineers (SPE) and UBM AEM, this year's event – themed “Shaping the Energy Future: Integration and Diversification” – will bring together industry leaders, experts, stakeholders, and oil and gas professionals from different sectors of the industry, to discuss the latest trends, challenges, and technological advances.

“The future of energy is rife with complex uncertainties, which is how we selected this year's theme,” said Nizar Al-Adsani, CEO,

“The future of energy is rife with complex uncertainties”



KOGS is expected to attract more than 5,000 visitors

Kuwait Petroleum Corporation, and Conference chairperson. “Global demand growth will be entirely generated by developing nations, while greater energy efficiency from technological developments will keep global demand in check. Staying informed of market developments is necessary to drive long-term strategic decisions. The delegates who attend KOGS will gain knowledge to keep them ahead of the competition.”

Delegates at the show can participate in four panel sessions with topics ranging from diversification along the supply chain to upstream innovation and challenges. The event also features seven special sessions, four technical special sessions, a ministerial panel, and an executive plenary session.

The call for papers received an excellent response with 628 paper proposals being

submitted from 153 companies across 36 countries. 143 papers have been selected for presentation across 21 technical sessions.

More than 200 companies from 20+ countries will be in attendance at the parallel exhibition that takes place from 16–18 October 2017. The 14,000 sq m international showcase features flagship participation from NOCs and IOCs, state-of-the-art equipment, machinery, technological advancements and innovative services in the oil, gas, refining and petrochemical sectors.

Over 5,000 attendees are expected to attend KOGS 2017 and exchange technical and business expertise in a highly focused B2B environment. ■

For further information contact Joy Isaiah, jisaiah@spe.org; Joanne Blundell, jo@aemallworld.com. www.kogs2017.com.

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Transforming Kuwait's oil and gas future

Hosnia Hashem, conference programme chairperson and deputy CEO Olefins and Aromatics, Petrochemical Industries Company (PIC), speaks exclusively to *Oil Review Middle East* in the run-up to KOGS 2017.

What is the thinking behind the conference theme, 'Shaping the Energy Future: Integration and Diversification?'

Integration and diversification are very important initiatives in this sector, particularly at this time of low oil prices. The reduction of costs in upstream and downstream is a prime element. It is only through the integration of activities that we can detect the opportunities for optimisation and cost reductions. While the diversification of the pool of resources, production methods and enhancements strategies, as well as the incorporation of more actors in the upstream and downstream, helps in the overall objective of optimising the oil sector.

So integration and diversification are the most important drivers of the industry as of today; they are already shaping the energy markets and will shape the energy future.

Are there any features of the conference you would like to highlight?

KOGS will again be a great opportunity to liaise with the main national and international oil companies operating in Kuwait, their leaders and experts, as well as the private sector that provide services for the industry. I have no doubt that the networking, and most importantly the business opportunities that KOGS represents, will be once more remarkable, now that we have expanded the scope and outreach of this conference and exhibition to a large scale.

“ We have a huge and solid base of reserves that will sustain our industry for many, many decades to come”

What do you think are some of the main issues and challenges facing Kuwait's oil and gas industry?

In Kuwait, we have a huge and solid base of reserves that will sustain our industry for many, many decades to come. We have maintained investments in upstream and in downstream, reflecting the trust in our industry capacity to progress and maintain its prime role in the world markets.

In upstream, we have engaged in the modernisation and expansion of activities, and in the implementation of new production areas, including non-conventional resources such as heavy oil, supported with agreements with International Oil Companies, to propel this segment to engage in world best practices and technologies.

In downstream, and the petrochemical segments, progress is undeniable, with three massive new projects at the Al-Zour complex. The first of these will be a refinery, followed closely by an LNG importing facility, and finally a petrochemicals plant. These investments will raise



Hosnia Hashem, conference programme chairperson and deputy CEO Olefins and Aromatics, Petroleum Industries Company (PIC)

Kuwait's standing in the downstream sector and increase our refining capacity to 1.4mn bpd, along with the Clean Fuel Project involving the expansion and upgrade of existing refineries. So, I see progress and transformation towards an era of growth very important in my country. The main challenges will be the availability of skilled talent, and the rapid preparation of Kuwaiti human capital to match these great challenges.

What are your views on prospects for Kuwait's energy sector and how it will evolve in the future?

Kuwait will maintain its prestige as a reliable producer, grounded on solid efficiency. We will have a more diverse portfolio of crude oils and refined products. This evolution will enable the participation of more and more skilled Kuwaitis in the leadership and technical ranks of all the so-called K-companies of Kuwait Petroleum Corporation and its subsidiaries.

Most probably, in the future we will also see a more dynamic industry, where closer integration with the private sector will result in new business schemes, adapted to the reality of oil prices that will prevail in the future.

My view is optimistic, and cannot be otherwise, given the rooted success I have seen from the new generations of professionals in the upstream and downstream sectors. ■



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A new era of digital data for the compressed air market

Charles Joel, global IoT and analytics director at Gardner Denver, explains how the Internet of Things (IoT) can enable users of compressed air services to optimise and improve their processes.

THE FOURTH INDUSTRIAL revolution is driving every business to share and analyse asset data, and the IoT is showing no signs of slowing down. IHS Markit forecasts that the market will grow from an installed base of 15.4 billion devices in 2015 to 30.7 billion devices in 2020, and then 75.4 billion in 2025¹.

It is surprising then that, up until this point, the compressed air market – for all its consumption within industry, leading to its status as the ‘fourth utility’ by many – has yet to truly capitalise on the opportunities that the IoT presents. Indeed, UK industry uses over 20TWh of electricity every year to compress air, equivalent to the output of four power stations and over 8.1mn tonnes of CO₂ emissions². As a result, high-quality energy and performance at a cost-effective price continues to be a key consideration for all businesses, and data-driven insights that can help achieve this are to be encouraged.

With generating compressed air accounting for 10 per cent of total energy costs in industry³, ensuring wastage is kept to a minimum should be a key concern for all operators. Industry averages suggest energy costs account for more than 80 per cent of the total cost of ownership of a compressor, so any initiatives that can help companies identify inefficiencies and assist with performance optimisation, leak reduction and practical air management processes should be welcomed. Industry 4.0 and the IoT are, without doubt, the greatest opportunities available today to help organisations work smarter.

“The trend seems to be to only consider data when an issue arises”

Yet many organisations simply do not have the time or resources available to make the most of the data and information they collect. Alternatively, the trend seems to be to only consider data when an issue arises, rather than using it to effectively manage a compressed air system on an on-going basis. In short, there is a danger that data loses its meaning if it is not used in the right way.



The compressed air market has yet to truly capitalise on the opportunities that the IoT presents

Simple data, predictive and cognitive analytics

There are three key stages to analytics. The first is as simple data, outlined above, which is where data is collected but not processed in any meaningful way. Most of the world’s digital data is unstructured, and therefore lacking value.

The next phase is predictive, whereby analytical tools are used to ‘consume’ data. This will then make predictions about unknown future occurrences, using a range of techniques such as data mining, statistics, modeling and machine learning to do so. ‘Edge analytics’ is a key term within this context too, essentially referring to an analysis that is performed at the point of data being generated.

When based upon logical and intelligent rules, predictive analytics can give businesses the right information, when needed. For the IoT to truly be successful in the compressed air market, businesses will need to work collaboratively with an informed and knowledgeable organisation that has the in-depth understanding to establish the right rules within a system. These are the rules that will provide valuable insights into how a compressed air system is running, and offer recommendations into how its operations could be optimised and improved.

The final stage is cognitive analytics. This is a strategy that describes how analytics and technologies can be applied to help humans make smarter decisions. A cognitive system will learn through its interactions with data and responses from the end user. It draws inferences from existing data and patterns; draws conclusions from existing knowledge bases; and then learns from this to inform future decision-making and business intelligence. And because a cognitive



The CompAir Ultima U160 oil-free compressor

system is in a perpetual state of learning, it will keep adapting to deliver the required outcomes in the most efficient way possible.

Cognitive analytics is a true blend of human and artificial intelligence, and the desired outcome for those that are really trying to develop the analytical models available on the market. These systems learn automatically, helping to improve a business' productivity, efficiencies and – as a result – the overall customer experience. The potential for this level of insight is really exciting, as it is technology that will automatically learn from past data and experiences, and create new systems as a result.

A new iConn

To meet this need, Gardner Denver has introduced a new digital platform, iConn, to the market.

iConn is a cloud-based, air management platform, which has been developed to deliver advanced analytics, enabling operators to stay in control of their installation. The system provides historic, real-time, predictive and cognitive analytics, allowing users to rectify potential issues before they happen.

“The potential for this level of insight is really exciting”

The platform is particularly beneficial for businesses with multiple remote sites or unmanned installation, as it enables users to monitor compressor performance from a single location, via their mobile device,

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tablet or PC. iConn helps minimise fault incidences for increased uptime, and also provides detailed machine parameters and over-time trend analysis to enable plant managers to optimise system performance.

Compressor or ancillary asset data can be transferred securely via GSM, Ethernet or Wi-Fi, to a wide range of connected devices, ensuring data security. iConn's cloud-based services also allow users to view real-time analytics or access data through open APIs.

“ The aim is to provide a one-stop digital experience for managing an entire compressed air system ”

An open future

One of the biggest changes to the IoT in industry is the move from closed, proprietary mechanisms to open ones. Gardner Denver is assisting organisations with systems integration, helping information technology and operational technology work together.

While iConn is available as standard on all new CompAir machines and can be retrofitted to existing compressor installations, a key feature throughout its development has been the fact that the platform also supports ancillary and non-Gardner Denver based products. The aim is to provide a one-stop digital experience for managing an entire compressed air system.

Most customers will have purchased from lots of different brands over the years and throughout various product lifecycles. iConn, however, is not intended to be solely a Gardner Denver-based system. Indeed, other data provides richer insights into the quality of a compressed air system. Like the IoT, which has been successful exactly because it's been disruptive, iConn is creating a service that will provide truly meaningful insights no matter who manufactured the technology that is being used.

For those seeking a smart manufacturing strategy, data analytics offers organisations the most valuable means of evaluating compressed air generation yet available on the market, helping professionals to manage, optimise and improve usage. The question is: are you making the most of this opportunity? ■

¹IHS Markit, *IOT Platforms: Enabling the Internet of Things*, <https://www.ihs.com/Info/0416/internet-of-things.html>

²The Carbon Trust, *Compressed air: Opportunities for business*, https://www.carbontrust.com/media/20267/ctv050_compressed_air.pdf

³The Carbon Trust, *Compressed air: Opportunities for business*, https://www.carbontrust.com/media/20267/ctv050_compressed_air.pdf

For more information on iConn, please visit www.gardnerdenver.com. Gardner Denver Industrials Group delivers the broadest range of compressors and vacuum products, in a wide array of technologies, to end-user and OEM customers worldwide in the industries it serves. Gardner Denver Industrials Group, part of Gardner Denver, Inc., is headquartered in Milwaukee, Wisconsin, USA. For further information, please visit www.gardnerdenver.com.

OSRL tests and validates remote sensing equipment

OIL SPILL RESPONSE Ltd. (OSRL), the international industry-funded cooperative which responds to oil spills anywhere in the world, recently conducted an offshore exercise designed to understand how remote sensing technologies can help detect oil spills at sea more effectively.

Utilising the latest in satellite, airborne and in-water surveillance and communications equipment, the highly successful event demonstrated the value of the state-of-the-art technology in identifying and monitoring spills and was conducted with full approval of the Marine Management Organisation (MMO) following a rigorous planning and stakeholder consultation process.

The main surveillance tools and providers involved in the exercise included:

- Radar and optical satellite imagery (MDA, Earth-1, Airbus, Telespazio)
- Infra-red and Ultraviolet sensors on the OSRL UKCS aircraft (2Excel Aviation)
- Airborne hyperspectral sensors (2Excel Aviation)
- Unmanned Aerial Vehicles (UAVs) (Sky Futures and Bristow Group)
- Autonomous Underwater Vehicles (AUVs) (Blue Ocean Monitoring and Planet Ocean)
- A surveillance kite with COFDM link (Domo Tactical Communications (DTC))
- IP Mesh Network on vessel and crew (Briggs Marine and DTC)
- SCAT (Shoreline Clean-up Assessment Technique) based surveys testing a new SCAT e-tool.

The exercise was showcased through OSRL's Southampton-based Visualisation Centre, which provided a 'GIS Platform', integrating data from each of the technology partner's equipment as well as oil spill modelling platforms and satellite feeds.

The exercise took place in open sea off the southern coast of England. A minimal amount of oil was released under carefully controlled conditions and with approval from the MMO. On hand was the full complement of oil spill response equipment and personnel, including a purpose-equipped vessel, containment and recovery equipment, and UK approved dispersant.

"Achieving maximum effectiveness in response to an oil spill incident is based on prior preparedness and understanding the capabilities of the equipment contained within our 'response toolkit'," commented Robert Limb,



AUVs were used in the exercise

chief executive for Oil Spill Response Ltd.

"As a result, we are constantly reviewing the potential impact the latest response technology can have on further negating the impact of a spill incident. Through the course of this exercise we were able to monitor, evaluate and mitigate the oil – giving us, our members and the general public total confidence in our systems and approach."

The remote sensing technology used was able to identify and monitor the controlled spill, and OSRL was satisfied by the performance of the various new technologies involved. In addition, the response equipment and personnel operated in an efficient and effective manner providing validation of OSRL's approach.

"We work closely with technical partners to monitor developments in cutting-edge remote sensing technology to identify development opportunities for OSRL and its members. There is no doubt that as part of any oil spill response, both now and in the future, the technology we used on this exercise will continue to play an ever more significant role. Events such as this are vital to staying at the forefront of our industry and to delivering on our commitment to reducing risk and protecting the environment," Limb concluded.



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From component manufacturer to **system supplier**

For over 50 years, Stauff has developed and produced high-quality line components and hydraulic accessories for machine and plant engineering. Jörg Deutz, CEO of the Stauff Group, discusses the evolution of the company to become a complete systems provider, with the launch of 'Stauff Line'.

What is the strategy behind the launch of 'Stauff Line'?

Stauff Line is our key theme in 2017. It is the umbrella brand for all services that Stauff offers in connection with tube and hose lines for hydraulic systems, from the analysis and optimisation of existing line systems and the design of new tube systems to the supply of all components or customised assemblies to the customer's assembly line. The prerequisite for this is first and foremost our comprehensive components range for mobile and stationary hydraulic systems, which we have systematically grown in recent years. A decisive step in this development was the launch two years ago of our Stauff Connect tube connector range. We are also continuing to invest in the production facilities at our Stauff Group headquarters in Werdohl to facilitate the expected volume growth in this product range. This is in addition to the extensive capacities of the Volz Group in Deilingen, in which we have had an investment since 2013, and our own existing facilities. This summer, the first of several top-class multi-way machines became operational at our own site for the production of large volumes, enabling us to guarantee reliability of supply to our customers in the long term.

What role does cooperation with Voswinkel GmbH play?

The acquisition of Voswinkel in 2015 and the merger of both companies' product ranges was a key step in the development of Stauff Line. Voswinkel is one of the five largest manufacturers of quick release couplings globally, and also produces an extensive range of hose valves and fittings – particularly for the high-pressure sector. Voswinkel's extensive expertise and wealth of experience in the production of customised tubes is naturally directly incorporated in Stauff Line.

Many key line components were already part of our range, and we have expanded our development and manufacturing expertise for more line components over the years. These components include flanges, measuring couplings, valves and flow valves and of course Stauff clamps, which have proved themselves over decades, and have become synonymous with fast and simple tube and hose mounting. Stauff Line is the result of our integrated approach: we are now in a position to offer all individual components from our own production facilities, but at the same time we can also combine and supply optimised assemblies for specific applications.

“ Stauff Line is the result of our integrated approach ”



The 'Stauff Line' range supplies all components for hydraulic line systems from a single source, pre-assembled into assemblies if required

How are you doing this in practice?

Stauff Line is a scalable concept, which, in terms of products, ranges from the supply of all essential individual components of a hydraulic line to pre-assembled and ready-to-install assemblies and systems. It includes all the technical and organisational benefits offered by a coordinated range and one-stop procurement. Naturally with both, there is the possibility of relying on convenient procurement solutions, such as our online shop or EDI link and individually tailored delivery models. These logistics services can also be scaled and range from the Kanban supply at component and assembly level to the use of special equipment carriers, so-called shadow boards or A-frames.

Stauff Line products have a consistently high quality design. A large proportion of the range is produced in steel, as standard, and many other components have a high-grade Stauff zinc/nickel surface coating. The latter guarantees reliable corrosion protection far beyond previously accepted market standards – even after transport, machining and assembly of the components – and meets all applicable statutory requirements. The proportion of products with a zinc/nickel surface coating is being consistently extended.

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A good example of the technical coordination of individual components, beyond their high-quality finish, involves the sealing cone hose fittings with block stop, developed by Voswinkel, which close the general safety gap between fitting and tube connector. The full sealing function of the connector continues to be permanently and reproducibly guaranteed even after it has been loosened and re-tightened multiple times, for instance when replacing a hose line.

The Stauff Line concept is based on our expertise in the development and manufacture of components, which has grown over many years. We will continue to invest in research and development, production and logistics, in short to do everything possible to further improve the quality and availability of the individual components.

What is the advantage of pre-mounted assemblies and systems?

The development and pre-assembly of line modules with all the necessary components, including bent tubes and prefabricated hoses, coupled with supply directly to the manufacturer's assembly line, reduces procurement costs, assembly times and stock levels. The equipment carriers previously mentioned are used for optimum handling on site, to simplify the identification of components and minimise the risk of confusion, thereby further improving installation safety. Stauff Line thus enables us to take responsibility for the entire hydraulic line, from connection to connection, and we are available to our customers as a key partner, from planning and design through to delivery and assembly on site.

How are you positioned internationally?

The Stauff Group provides all our services worldwide, with our subsidiaries in some 20 countries worldwide and further authorised



The basis of 'Stauff Line' is the comprehensive range of components systematically expanded over the years

system and retail partners in all major industrial regions. Our subsidiary in the UK was pioneering in its systematic approach and has over 30 years of experience in the design, production and pre-assembly of ready-to-install line and tube systems. Stauff Line enables us to be prepared to meet the requirements of cross-sector machine and plant manufacturers, the production and assembly sites of which can access our products and services. That is already an important success factor, independent of Stauff Line, which can only become even more important in the future. ■

FlowJet pump enables production logging surveys in wells equipped with artificial lift systems

A SIGNIFICANT PROBLEM for artificially lifted wells (ESP, BP, PCP) is the difficulty of running production logging using MPLT while the well is producing by pump, unless a Y-tool or dual string is installed with the pump.

This lack of data about reservoir performance has a big negative impact on well reservoir management, particularly on

production optimisation / production restoration.

However, there is a solution for artificially produced wells which cannot be evaluated by production logging once artificial lift is being performed in the well.

FlowJet pump is a new way to perform essential production logging surveys in oil wells equipped with artificial lift systems.

Flow jet technology allows MPLT in artificially produced wells to be done in well flowing mode on an opportunity basis.

In the case of a well produced by ESP or BP or PCP, just POOH (pull out of hole) the existing pump and run the special jet pump (FlowJet pump) on workover rig pipes and perform MPLT through it. In this case the FlowJet pump will perform as a standard artificial lift, but it has a provision for pulling the cable or CTU, and logging can be performed in well flowing mode.

The following technology video shows how it works:

<https://www.youtube.com/watch?v=-XsoR58gn0s>

FlowJet pump for MPLT will help to increase the quality of any reservoir-related workovers (water shut off, stimulation, perforation) based on MPLT data acquired on an opportunity basis, and increase oil production from the well. This technology also can help to open up closed-in wells due to high water cut.

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2. Pull pump and run FlowJet pump assembly for production logging.
3. Perform complete MPLT through FlowJet pump in well flowing mode.
4. Get MPLT interpretation on Big floor in 2-3 hours.
4. Perform reservoir enhancement activity based on MPLT results.

STEP 2

1. Run FlowJet pump assembly with MEFM tool (Gross, water cut, T, P)
2. Perform downhole well-test with FlowJet for workover quality assurance
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A Swiss SU **ess**

The latest in digital wireless paging technology is supporting a new production field in the Gulf.



Swissphone offers proven technologies and best-in-class devices for hazardous areas

DEVELOPED ON BEHALF of the Abu Dhabi Marine Operating Company (ADMA-OPCO), the installation will exploit an oilfield which lies beneath the waters of the Arabian Gulf, some 120 km from Abu Dhabi City. It is expected to become operational in the early months of 2018.

Centred on two newly constructed artificial islands, the Satah al Razboot (SARB) project provides for the drilling of 86 wells together with a comprehensive range of supporting installations.

A key part of the safety system

"In our project, let's say that there are 20 different systems. We have to make sure that those different systems are integrated and working together so as to make sure that the larger project, the US\$1.5bn, is actually handed over to the customer without any problems.

"If they were to select the wrong manufacturer, it may hold up all of the plans. So that's why a company like Swissphone is well regarded and can be accepted in an oil and gas environment.

"We are one of the smallest contractors, because our portion was US\$15mn – it's really just one per cent! So whilst it's a penny to drop in the ocean, in terms of the larger project all of those pennies must come together in order to deliver the production facility. And if one of those pennies is not right, then the customer will not take over the platform."

Walid Gamali, chief executive of 3W Networks

The wireless alerting system is being supplied by a specialist subcontractor, 3W Networks – a Dubai-based systems integrator which is active in the Middle East and Africa. "The sectors we focus on are the energy sectors, and that is oil and gas and power and water utilities," explains Walid Gamali, chief executive of 3W Networks. "But, being based in the Middle East, our biggest sector is oil and gas."

Because of the offshore industry's heavy reliance on telecommunications, the ADMA contract is a significant one for 3W Networks. "From the size point of view, for us it is a US\$15mn project," comments Gamali. "The oil and gas project has many telecommunications and security systems. We are building that telecoms infrastructure using different technologies and systems.

"Normally when we have any specific telecoms and security project, there are certain products which the customer would qualify as approved products. Being a partner for many OEM suppliers where we are the telecoms system integrator, we select the product where 3W Networks has partnerships and trained resources. For this project, Swissphone was the partner of choice for a key part of the safety system."

Alerting, announcing

Paging equipment from Swissphone is one strand in the web of radio and telecommunications installations that will be needed to operate the oilfield as it opens up; yet it is an essential one for several reasons, not least the safety of personnel. "In most of the oilfields which we deal with, usually they require a paging system as an alarming solution," says



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Gamali. "Paging is only for one-way communication – it's for alerting and announcing on-air, mainly."

For a large part of its everyday mobile communication needs across the site, the oilfield operator will be able to use a local TETRA-based digital two-way mobile radio system. TETRA systems are rich in features and very capable – but a paging network based on the POCSAG messaging standard, which has been proven around the world through many years of operation, can deliver the message dependably in even the most difficult radio conditions. However, this reliability was just one of the factors in 3W Networks' choice of Swissphone messaging equipment for this project.

"Two-way radio is very easy to use, but paging is required for two reasons", Mr Gamali continues. "First, it is required as a fallback option if the two-way radio system fails. And another point: in this project, the TETRA system is totally provided by Abu Dhabi police – and so ADMA will not have the full features like interfacing third-party systems or having their own dispatching systems. ADMA will just have portables running on this network. So our client needs a system owned by him for fully integrated alarming options and also as a standby for the TETRA two-way radio. In oil and gas, redundancy is required especially for the outdoor transmitters because if there is any power failure in the main transmitter or any issues, a standby system should take over immediately.

"And the third thing is to interface it to other systems like fire and gas systems through an alarm server also provided by Swissphone, if there are any alarms, and also to interface it with our internal systems in the project. All these interfaces and all these possibilities will not be available in TETRA."

Seeking and finding

3W's engineers have installed Swissphone paging systems on each of the three islands, each one providing indoor coverage within buildings as well as outdoor coverage. Management and message dispatching terminals are provided at each site, and the sites are interconnected over a shared business LAN.

The installation is based on Swissphone's modular I.SEARCH concept, an alarm server platform which maintains a database of pagers, messages and settings, and supports a comprehensive range of messaging and alerting services, with automatic logging of calls and transmitter state. Messages can be directed to individuals or groups by telephone, web input or email, together with a callback number or other options. Predefined messages can be triggered automatically in specified circumstances, with instructions on how to respond.

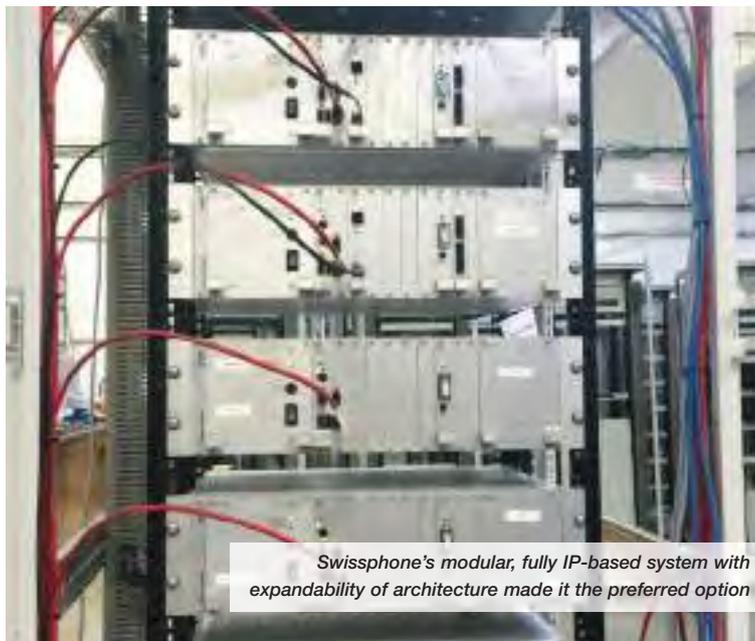
The alarm terminal equipments (pagers) selected by 3W Networks are from a range of personal alphanumeric devices supplied by Swissphone. The robust DE920 Ex pager has a three-line text display and a straightforward three-button user interface and is rated for usage in potentially explosive atmosphere or where air and flammable gases mix (formally, ATEX Protection Class II 2G EEx ib IIc T4).

Absent employees can have their calls forwarded by the system to someone else. An escalation management function enables unanswered alerts to be handled according a prepared plan. And there is an absence feature for the pagers themselves: Swissphone's multi-slot recharging stations can be monitored remotely by the administrator over the LAN, to find whether an individual pager is available for use or is out on duty.

"One most important thing," adds Gamali, "we can operate the system via a web browser, so there is no need for special software or a special licence to run the system."

High availability

Another element of importance in this messaging application is Swissphone's High Availability Cluster module, which combines two I.SEARCH racks into a cluster. "Our client likes the clustering mode," comments Gamali. "Instead of having an auto changeover unit for the



Swissphone's modular, fully IP-based system with expandability of architecture made it the preferred option

main and standby, clustering mode makes the main and standby understand each other and they are monitoring each other without any additional box for auto-changeover."

The whole cluster can be addressed via a single virtual IP address.

One further benefit in a multi-site paging network such as the SARB installation is that the Swissphone system is fully asynchronous. "We had experience before with another vendor supplying the paging system, and there was a requirement to have a GPS clock with every transmitter", Gamali recalls. "If there was any timing issue, this would cause a transmission error. So having an asynchronous system helps us to have outdoor coverage and indoor coverage without having a GPS clock attached to every transmitter."

One final task for Gamali's team before the system can be handed over to the client will be to fine-tune this sequence of operations in the field for optimum performance.

"Every project we do is a bespoke project," comments Gamali. "Every time the client has a requirement, it is different to other clients, so we do a lot of detailed engineering in order to provide the exact solution. One of the key reasons for success in the Middle East is high-quality after-sales service. Being a close partner of Swissphone creates a win-win-win situation; for Swissphone, we are close to the customer, for the customer, we have direct access to Swissphone's expertise." ■

Meeting the users' needs

Why was Swissphone equipment chosen for the SARB project? The engineering team manager for 3W Networks, lists several reasons. "At the start of the project I did a presentation for ADMA for possible vendors to supply their paging system. For high-level points, first the Swissphone system was a modular system – so you have one rack, one chassis and you have different options for cards for input/output and also for transmitters. Second point, their system was fully IP-based. This clearly stands out, compared to other vendors."

New s.QUAD ATEX

Swissphone's newest pager, the s.QUAD ATEX can be used in the most sensitive zones without risk thanks to its protective measures and because it is passive to radiation (approved according to (Ex) II 2G Ex Ib IIC T4). The s.QUAD ATEX is available for digital POCSAG networks or analogue radio networks. It has an outstanding reception performance, a multi-coloured alarm LED and a very high alerting volume.

Leading in the heat transfer industry

Dolphin Heat Transfer LLC (DHT) continues to experience growth in the Middle East.

DOLPHIN HEAT TRANSFER LLC (DHT), a leading company engaged in the field of design and manufacture of shell and tube heat exchangers, air-cooled heat exchangers, pressure vessels, storage tanks, and finned tubes, is experiencing continued success in the Middle East.

DHT caters to the requirement of various clients in the oil and gas, petrochemical, chemical, refining, power and refrigeration industries.

Dolphin has a state-of-the-art facility covering two manufacturing shops of 3,000m² each (total area 6,000 m²) with all modern fabrication infrastructure and design software, in the Ajman New Industrial Area.

Products can be offered with ASME 'U' 'U2' & 'S' stamps for design and manufacture and with National Board 'R' Stamp for repair and alteration. The company is also ISO 9001: 2008, ISO 14001: 2004 & ISO 18001: 2007 certified by TUV. Its ASME authorised inspection agency is Lloyds Verification Ltd. The company says that all products are designed and manufactured by a skilled and dedicated team of engineers and workmen with experienced managerial staff, ensuring economical prices and on-time deliveries.

“ Lower oil prices have put pricing pressures on our end products, but have also made us more efficient”

The company carries out thermal and mechanical design, detailed fabrication drawings and fabrication of shell and tube heat exchangers as per ASME Sec VIII Div. 1, Div. 2 & TEMA. Fabrication facilities include CNC drilling machines, orbital welding machine, microprocessor-based telescopic expansion machine, CNC plasma cutting and column and boom SAW machine, in addition to regular machines such as plate bending, TIG / ARC welding, grinding and EOT overhead cranes etc.

In air-cooled exchangers (fin fan coolers), DHT carries out thermal and mechanical design. These coolers can be supplied with various types of finned tubes like 'L', 'G', 'KL' & extruded etc. depending on service and operating parameters. The coolers are supplied with forced draught / induced draught fans procured from leading worldwide manufacturers. This equipment is designed generally as per ASME Sec VIII Div. 1 & API 661.

All heat exchangers can be manufactured in various materials such as carbon steel, stainless steel, nickel alloy, Monel, Inconel, Hastelloy, titanium, duplex, brass and cupro nickel.

DHT has the capability to design and manufacture pressure vessels and tanks, as per ASME Sec VIII Div. 1 in various materials.

Finned tubes are manufactured on the latest state of the art McElroy Mark V finning machines from the USA. Various types of fins such as 'L', 'G' & 'KL' can be manufactured with aluminum. Base tube size ranges from 5/8" OD to 2" OD, and tube material can be selected as per application.

DHT produces finned tubes for its own air cooler manufacturing as well as for supply for re-tubing purposes.

"Lower oil prices have put pricing pressures on our end products, but have also made us more efficient both in terms of material costs as well as operations," says DHT.

"We are expecting an improvement in the oil and gas business as industry adjusts to the new reality of lower oil prices and new projects start to kick in. Additionally, we expect demand to grow from the new sectors where we have diversified. We have experienced good growth in the power and industrial process cooling sectors where our heat exchangers find applications similar to the oil and gas industry.

"Product quality and delivering projects on tight schedules have been the strong points of Dolphin Heat Transfer LLC, in addition to the high level of commitment of our employees who are always enthusiastic to face challenges." ■


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Owner operators and the challenge of change

Rafi Hattar, vice president Middle East & Africa, Hexagon PPM discusses the challenge of change management, and how modern engineering technology can help.

ALL OIL AND gas plants and facilities are subject to continual change – technologies evolve, turnarounds are executed, modification and upgrading projects take place. However, the facilities themselves and the information that describes them are often not consistently updated in line with these changes, creating challenges for the effective and safe operation of the facility.

A recent study by Hexagon PPM showed that some of the biggest challenges met by owner operators include the inability to find the necessary information for executing projects and being able to determine whether or not this information is accurate and up-to-date. This is often due to lack of change management and traceability, where companies don't have an integrated approach to engineering information management. If you have 30 years' worth of plant documentation in paper format scattered across the facility, it is no wonder that management of change (MOC) becomes a burdensome task.

Challenge of efficient change management

A paper-based approach does not allow tracking and prevention of unauthorised changes, making maintaining an integrated information asset difficult. In addition, safety issues are often linked to poor management of change, which has too often been a direct or indirect cause of major incidents, claiming lives, and destroying facilities.

These issues have led to a growing focus from regulatory authorities on MOC processes, and demands for demonstrable compliance with auditable traceability are continuously increasing. Existing facilities are also often being operated longer than originally planned. In the worst-case scenario, extended lifetime, combined with



Augmented reality solutions bring engineering information live during a plant walk-through

poor traceability and insufficient processes in place, can lead to increased risk of losing one's license to operate.

Managing change in an operating plant is a complex, safety critical work process, where continuous changes need to be managed. These changes often have to be controlled in parallel, if the same equipment is impacted by several changes. This can get complex quickly, as multiple alternate solutions to the proposed changes need to

process can easily lead to erroneous decision-making that is based on incorrect or outdated data. The implications of this include extended plant downtime during implementation of changes.

How can software technology help?

To address these challenges, owner operators are searching for tools that offer the capability to maintain the dynamic engineering design basis and integrate with other information systems. An example of such a solution is Hexagon PPM's SmartPlant® Enterprise for Owner Operators that provides preconfigured work process and out of the box integrations with operating systems to provide major improvements for management of plant operation changes.

This integration between operating systems and engineering information management allows for maintenance of the digital representation of the plant in an efficient and consistent way. Comprehensive solutions for capturing both

“ These issues have led to a growing focus from regulatory authorities on MOC processes ”

be managed simultaneously, changes might be cancelled prior to implementation, or postponed for future turnarounds.

Executing the above-mentioned parallel activities in a manual, document-centric



Rafi Hattar, vice president Middle East & Africa, Hexagon PPM

“ Owners are increasingly using laser-scanning technology to capture the as-built information of their assets”

unstructured and structured data, as well as data validation, ensure the transition from an existing manual, document-driven change process to a state of the art electronic change process.

Creating a virtual representation of the existing asset

As mentioned above, often the existing engineering information and 3D plans of the existing facility might be insufficient, or completely missing. This makes any brownfield project challenging, as there is no way to ensure that the planned changes or upgrades will fit into the existing piping and space. To facilitate this, more and

more owners are using laser-scanning technology to capture the as-built information of their assets.

The whole process starts with surveying the plant with a laser scanner. Using the free Leica Truview software the scan data is presented as a point cloud, in which each pixel has X, Y and Z coordinates. This means that even without building a new 3D model, the point cloud can be used for measurements and comparisons with existing CAD models of the plant.

Together with the photographs, the captured brownfield data and the point cloud data make it possible to do a virtual walk-through of the plant, from one scanning station to another, and to take measurements. Based on this information, a virtual presentation of the physical asset can be created, enabling owners to execute data-centric approach to change management, and overcome many of the challenges related to manual processes: inaccuracy, lack of traceability, and error-proneness. ■

For more information, visit hexagonppm.com.



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Going from strength to strength

Now in its 45th year, Gas & Oil Fields Services Company (GOFSCO) has grown to be one of the largest integrated service providers in Kuwait, forging strong relationships with Kuwait's oil and gas giants.

THE ROBUST DEVELOPMENTS in oil exploration and production in the 1960s resulted in Kuwait embarking on a quest to optimise development of infrastructure, equipment, intellectual property and services to oil and gas companies. To meet the growing demands of upstream oil and gas companies operating in Kuwait and the wider region, Gas & Oil Fields Services Company (GOFSCO) was established in 1972 to provide a complete range of oilfield services. The company has since grown to be one of the largest integrated service providers in Kuwait specialising in the upstream oil and gas sector, both onshore and offshore.

Now in its 45th year of operation, GOFSCO remains resilient, achieving greater standards of excellence year after year and making a name in the industry by making strategic decisions to pioneer new technologies and services to meet the needs of the evolving oil industry. This has allowed the company to cultivate solid relationships and become integral business partners to Kuwait's oil and gas giants, namely, Kuwait Oil Company (KOC), Kuwait Gulf Oil Company (KGOC), and other KPC companies.

GOFSCO's game-changing solutions backed by its large well-managed fleet provide petroleum companies with the best tools and team of engineers that work to ensure the successful completion of all projects. The company's core services rely on slickline services, wellhead maintenance and repair, field services, surface well-testing and manpower services. In addition to oilfield services, GOFSCO also supplies petroleum and energy producing companies with a range of products to support their production



Hussam Ali Marafie,
chairman and CEO,
GOFSCO

processes through the Middle East. Amongst the vast product range, some of GOFSCO's main product offerings include oilfield lubricants and sealants, fluids and chemicals, instrumentation products, oilfield tools and equipment, well service and production equipment.

Steering the company to greater heights is GOFSCO's chairman and CEO, Hussam Ali Marafie, who has witnessed the robust development and evolution within the industry over the past three decades. "The volatility in

To further expand its services to the oil and gas sector, and building on its well services expertise and customer base, GOFSCO has formed a Special Projects department, with KOC as its main customer. The Special Projects department, based in a dedicated office in Ahmadi, manages the projects through a team of highly experienced engineers, project managers and technical experts. GOFSCO's Engineering, Procurement, and Construction (EPC) capability is enhanced through collaboration with its local and international partners in the UAE and India. All projects are executed with paramount consideration for the health and safety of all personnel and environmental protection for the well-being of all current and future participants in the company's operations, says the company.

Sharing his vision for GOFSCO's growth plans, Marafie said, "While there is still room to grow further and expand within the local market, there are external factors that still pose restrictions on our growth plans. To overcome this, we have maintained persistence in developing our workforce and equipping them with the latest in engineering technologies to handle the entire oil manufacturing and discovery procedures. We take pride in our customer-centric strategy, which is part of our DNA, and a culture that we collectively embrace to deliver industry-leading returns." ■

“The volatility in the oil industry is often concerning, but has also armed us with the impetus to be game changers”

the oil industry is often concerning, but has also armed us with the impetus to be game changers in providing our customers with seamless and reliable solutions. Our key competitive edges in underlining our growth plans have always been our strategic approach in utilising technology and more importantly, our team," he comments.

Byrne Equipment launches new operation in Kuwait

BYRNE EQUIPMENT RENTAL, supplier of diverse equipment and plant across the GCC, has recently launched a further base of operation in Kuwait, with the depot strategically placed in Mina Abdullah and offices located in Fahaheel.

This is the Group's fourteenth operational base in the Middle East, with a presence already in UAE, Saudi Arabia, Qatar, Oman & Bahrain.

Activities in Kuwait will be complimented by the wider Group, and together they continue to be unique in their ability to offer high quality equipment rental solutions throughout the region. These services will be offered to a broad variety of sectors including but not limited to oil and gas, construction, infrastructure, marine and the leisure and tourism industries.

The product range for the Kuwait operation will build upon Byrne's successful "one-stop-shop" model approach, satisfying all customer requirements in all segments of trade and industry. It will provide specialist oil and gas related products that represent the region's focus and demand. Products will include blast resistant modules, 100 per cent portable oil free compressors with desiccant dryers, steam boilers, Alimak industrial hoists and mast climber, complete state of the art oil and gas skid-mounted and trailer-mounted support modules to name but a few, besides the already established power and light solutions.

Byrne works hard to ensure that its rental fleet is constantly updated to carry the latest and most efficient brands of equipment. The Group's corporate ambition is to continuously add products to their portfolio in order to further broaden their appeal and enable operational efficiency through equipment rental and lease solutions.

The company delivers a dedicated commitment to customer service, unparalleled in the industry and this is supported by providing a 24/7 round the clock service accessible to all customers at any given time.



Blast resistant containers are amongst the products supplied by Byrne

Byrne acknowledges the tremendous opportunity and growth in the Kuwait market, which is currently second to none in the GCC. An aggressive development strategy has been implemented with focus on working with industry leaders in the region. Having been involved in some of the region's most ambitious projects over the years, working with many internationally recognised contractors, including Saudi Chevron Phillips, Saudi Kayan, (SABIC), Saudi Seamless, Saudi Arabian Kentz, Support Air UK, ABB Group, Yanpet (SABIC), SAMREF and Sip-chem, Byrne is keen to foster these relationships.

Safety is a primary focus for Byrne, which has recently been the recipient of the coveted President's Contractor Safety Award from Chevron Phillips Chemical Co. LLP for 2016. The company remains very positive in its outlook and is confident in its ability to exceed customer expectations in the new venture.

AkzoNobel introduces new reinforced chemical resistance tank lining

AKZONOBEL, A LEADING global paints company, has launched its advanced reinforced chemical resistance tank lining, Enviroline® 405HTR, to the Middle East.

The company says that Enviroline® is ideal for maintenance and repair projects, and assures greater operational efficiency, extended service life of assets and fast return to service. Suitable for use as a high temperature lining for storage of crude oil and produced water in storage tanks and pressure vessels, Enviroline® 405HTR highlights the exemplary track-record of AkzoNobel's linings product range in quality, reliability and corrosion protection, gained over 200 years of history in the industry.

A thick film glass reinforced 98 per cent solids polycyclamine cured lining system, Enviroline® 405HTR utilises advanced epoxy novolac technology. Replacing Enviroline® 405HT, the new and improved version delivers enhanced application benefits and chemical resistance improvements while complying with AkzoNobel's global standards in product stewardship and sustainability.

Andrea Meconcelli, director of Performance Coatings, AkzoNobel Middle East, said, "With the oil and gas downstream sector facing a challenging year, Enviroline® 405HTR is an ideal fit for our customers, as it helps achieve significant savings in labour and material cost. It also offers extended service life of assets and fast



The new product is suitable for use in storage tanks and pressure vessels. (Photo: Philip Lange/Shutterstock)

return to service, making it ideal for maintenance and repair projects. By reducing downtime and enhancing the durability of the assets, users are assured of their higher operational efficiency and long-term value.

"We are also planning to locally manufacture Enviroline 405HTR in Saudi Arabia, once again strengthening our supply chain capability and customer focus as well as linking to our ambition to bring AkzoNobel's global technology to the Middle East region."

Enviroline® 405HTR can be applied as a lining directly to properly prepared steel in a single coat with plural component airless spray equipment.

The product is designed to deliver outstanding high temperature (immersion service up to 150°C) and high pressure performance in a range of environments. Specified as a single coat application, with up to 1,500 microns in one coat, it has rapid curing properties, enabling a fast return to service in 14 hours at 25°C, thus minimising process disruption, shut-down time and overall installation costs.

AkzoNobel's range of performance linings are proven to provide long term asset protection and reduced process downtime while protecting even the most aggressive industrial cargoes at a wide range of temperatures, says the company.



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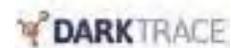
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Functional safety in times of rising cyber criminality

Dr Alexander Horch, head of the R&D and Product Management business area at safety specialist HIMA Paul Hildebrandt GmbH, offers some advice on achieving safety and security in production processes.

EVERY PRODUCTION PROCESS has inherent risks. Cyber criminality is now one of these risks. To achieve the greatest possible degree of safety and security in production processes, it is extremely important for enterprises to implement effective separation of their process control and safety systems, as required by standards for functional safety and cyber security. A lot is at stake: the health of employees, the assets of the company and the environment.

To better understand the interaction of safety and security, it is helpful to clarify several terms. There are numerous definitions of safety. However, a general definition is that safety is the absence of danger, so a condition is safe when there are no prevailing hazards. It is frequently not possible to eliminate all possible risks, especially in complex systems, so people in the industry often say that safety means the absence of unacceptable risks.

Reducing risks to an acceptable level is the task of functional safety. This means that the safety of an application depends on the function of a corresponding technical system, such as a safety controller. If this system fulfills its protective function, the application is regarded as functionally safe. This can be clarified by the following example: if a system cannot prevent icing in a pipeline, even though that is exactly its task, and a critical situation subsequently arises, that is a functional safety issue.

Functional safety systems protect people, facilities and the environment. They start up or shut down systems when hazardous situations arise suddenly and people do not



Dr Alexander Horch, head of the R&D and Product Management business area at HIMA Paul Hildebrandt GmbH

respond or are not able to respond, or when other safety precautions are not adequate. Functional safety systems are intended to prevent accidents and avoid costly downtime of equipment or systems.

Separate safety layers reduce the risks

Enterprises in the process industry are becoming increasingly aware of the importance of relevant standards for the safety and profitability of their systems. The IEC 61511 standard for functional safety defines the best way to reduce the risk of incidents and downtime. It prescribes separate safety layers for control and monitoring, prevention and containment and emergency measures. Each of these three layers provides specific functions for risk reduction, and collectively they mitigate the hazards arising from a production process.

IEC 61511 also prescribes independence, diversity and physical separation for each protection level. To fulfill these requirements, the functions of the different layers must be independent of each other. It is not sufficient to use different I/O modules for the different layers because automation systems are also dependent on functions in I/O bus systems, CPUs and software. To be regarded as autonomous protection layers, in accordance with IEC 61511, safety and process control systems must be based on different platforms, development foundations and philosophies. The system architecture must be designed so that no component in the process control system level or safety level can be used simultaneously.

Rising risk of cyber attacks

Since the attack by the Stuxnet virus on an industrial controller in 2010, we know that industrial systems are vulnerable and attractive targets for cyber attacks. In the last decade, the risk of cyber attacks on industrial systems has risen significantly due to increasing digitalisation. In addition to endangering information security, these attacks pose a direct threat to system safety.

System operators must be aware of these risks and actively address them by means of various systems and measures to increase cyber security. Unlike functional safety systems, which are mainly intended to protect people, these systems and measures protect technical information systems against intentional or unintentional attacks intended to disrupt production processes or steal industrial secrets.

Due to the conditions mentioned above, safety and security have become closely meshed topics. Cyber security plays a key role, particularly for safety-oriented systems, because it forms the last line of defense against a potential catastrophe.

Standards define the framework

Compliance with important international standards is necessary in the design,

“Reducing risks to an acceptable level is the task of functional safety”

operation and specification of safety controllers. The first of these is IEC 61508, the basic standard which applies to all safety-oriented systems (electrical, electronic and programmable electronic devices) in all industry sectors. The previously mentioned IEC 61511 standard, which is derived from the basic standard, is the fundamental standard for the process industry and defines the applicable criteria for the selection of safety function components.

The IEC 62443 series of standards for IT security in networks and systems, which effectively forms the standard for cyber security, must also be considered. Among other things, it specifies a management system for IT security, separate protection layers with mutually independent operating and protection facilities, and measures to ensure IT security over the full life cycle of a system. It also requires separate zones for the enterprise network, control room, safety instrumented system (SIS) and basic process control system (BPCS), each of which must be protected by a firewall to prevent unauthorised access.

Cyber security by design

Safety and security are closely related aspects of process systems, which must be considered separately and as a whole.

Standardised hardware and software in process control systems require regular updates to remedy weaknesses in the software and the operating system. However, the complexity of the software architecture makes it difficult or impossible to analytically assess the risks which could arise from a system update. For instance, updates to the process control system could affect the functions of the safety system integrated into the control system.

To avoid critical errors with unforeseeable consequences in safety-relevant processes as a result of control system updates, the process control system must be technologically separate from the safety system. This is the only way to ensure that control system updates do not impair functional safety.

For effective cyber security, it isn't sufficient to upgrade a product by retrofitting additional software functionality. Every solution for functional safety must be conceived and developed with cyber security in mind, right from the start.

Effective protection against cyber attacks

A proprietary operating system specifically designed for safety-oriented applications runs on HIMA's autonomous safety controllers. It includes all functions of a safety PLC and excludes all other functions. It is therefore immune to typical attacks on IT systems. The operating systems of the controllers are tested



Both the safety standard and the cyber security standard require separate safety layers

for resistance to cyber attacks during the development process.

In HIMA's controllers, the CPU and the communication processor are separate, ensuring high operational security even in the event of an attack on the communication processor. The controllers allow several physically separate networks to be operated on a single communication processor or processor module. This prevents direct access to an automation network from a connected development workstation and unused interfaces can be individually disabled.

“ Cyber security plays a key role, particularly for safety-oriented systems”

The SILworX® configuration, programming and diagnostic tool runs in a Windows environment and works in a manner as independent as possible from Windows functions. This concept enables secure operation without interference from other programmes. It provides maximum protection against operator errors and creates a set of proven data components for programming the safety PLC.

Nevertheless, SILworX allows automatic import of configuration data from outside systems into the proven data set via interfaces and the programming tool supports two-level user management, allowing user permissions to be set individually, providing optimal protection for both the application and

the safety system. For example, in the event of a password change, there is no need for an update or recertification of the system.

Cyber security is essential for functional safety

A noteworthy common feature of the process industry standard and the cyber security standard is that both require separation of the safety system (SIS) and the basic process control system (BPCS). This independence of safety systems is a good idea from practical and economic perspectives because the SIS and BPCS have very different life cycles and rates of change. System operators are thus free to choose “best-of-breed” solutions from different manufacturers.

Integration of comprehensive operational and maintenance data is necessary to enable the cost-effective operation of safety systems. Despite the required independence, HIMA systems can easily be integrated into all leading process control systems (Independent Open Integration), so HIMA looks after PLC-SIS integration and enables the desired functionality. Integration is implemented using high-performance, manufacturer-independent communication standards.

In summary, we can say that systems which are independent of the process technology and which, thanks to the principles of Independent Open Integration, can easily be integrated into process control systems despite physical separation, offer the highest degree of safety and security in safety-critical applications. Practical experience shows that they are the best way to increase the operational reliability and availability of process systems, thereby improving the profitability of production processes. ■



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.

Country	THIS MONTH			VARIANCE	LAST MONTH			LAST YEAR		
	Land	OffShore	Total	From Last Month	Land	OffShore	Total	Land	OffShore	Total
Middle East										
ABU DHABI	34	18	52	1	35	16	51	28	21	49
DUBAI	0	2	2	0	0	2	2	0	2	2
IRAQ	53	0	53	0	53	0	53	38	0	38
JORDAN	0	0	0	0	0	0	0	0	0	0
KUWAIT	52	0	52	-3	55	0	55	47	0	47
OMAN	53	0	53	-1	54	0	54	65	0	65
PAKISTAN	25	0	25	1	24	0	24	21	0	21
QATAR	4	6	10	0	4	6	10	3	2	5
SAUDI ARABIA	98	17	115	-4	102	17	119	107	17	124
SUDAN	0	0	0	0	0	0	0	0	0	0
SYRIA	0	0	0	0	0	0	0	0	0	0
YEMEN	0	0	0	0	0	0	0	0	0	0
TOTAL	319	43	362	-6	327	41	368	309	42	351

North Africa

ALGERIA	55	0	55	-3	58	0	58	56	0	56
EGYPT	18	6	24	1	21	2	23	19	8	27
LIBYA	0	1	1	0	0	1	1	0	1	1
TUNISIA	0	0	0	0	0	0	0	0	0	0
TOTAL	73	7	80	-2	79	3	80	75	9	84

Source: Baker Hughes

Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS, KUWAIT

Project	City	Facility	Budget (US\$)	Status
KGOC - Al Khafji Gas and Condensate Export Pipeline	Al-Khafji	Gas pipeline	2,100,000,000	Construction
KIPIC - Al Zour LNG Import And Regasification Terminal	Al Zour	Liquefied Natural Gas (LNG)	3,330,000,000	Engineering & Procurement
KIPIC - Al Zour New Refinery - Overview	Al Zour	Petroleum Oil Refinery	19,000,000,000	Construction
KIPIC - Al Zour New Refinery - Package 1 (Main Process Plant)	Al Zour	Petroleum Oil Refinery	3,000,000,000	Construction
KIPIC - Al Zour New Refinery - Package 2 (Support Process Plant)	Al Zour	Petroleum Oil Refinery	3,000,000,000	Construction
KIPIC - Al Zour New Refinery - Package 3 (Utilities and Offsites)	Al Zour	Offsites & Utilities	2,100,000,000	Construction
KIPIC - Al Zour New Refinery - Package 4 (Tankage)	Al Zour	Oil Storage Tanks	1,600,000,000	Construction
KIPIC - Al Zour New Refinery - Package 5 (Marine Facilities)	Al Zour	Petroleum Oil Refinery	850,000,000	Construction
KNPC - Clean Fuels Project - Mina Abdulla Refinery - Package 1	Mina Abdullah	Petroleum Oil Refinery	4,000,000,000	Construction
KNPC - Clean Fuels Project - Mina Abdulla Refinery - Package 2	Mina Abdullah	Petroleum Oil Refinery	4,000,000,000	Construction
KNPC - Clean Fuels Project - Mina Al Ahmadi Refinery Package	Mina Al Ahmadi	Petroleum Oil Refinery	5,000,000,000	Construction
KNPC - Clean Fuels Project - Mina Al Ahmadi Refinery Substation Upgrades	Mina Al Ahmadi	Substations	72,000,000	Construction
KNPC - Clean Fuels Project - Package 1 - Mina Abdulla Refinery Units 111, 112, 113 and 216	Mina Abdullah	Petroleum Oil Refinery	550,000,000	Construction
KNPC - Kuwait Clean Fuels Project - Overview	Various	Petroleum Oil Refinery	13,000,000,000	Construction
KNPC - Mina Abdulla Debottlenecking of Coke Unit 20	Mina Abdullah	Petroleum Oil Refinery	100,000,000	EPC ITB
KNPC - Mina Al Ahmadi Refinery Fifth Gas Train	Mina Al Ahmadi	Gas Production	2,000,000,000	Construction
KNPC - Mina Al Ahmadi Sulphur Handling Facilities	Mina Al Ahmadi	Sulphur Recovery	100,000,000	Engineering & Procurement
KOC - Al Zour New Refinery Crude Oil Pipelines	Ahmadi	Oil	1,650,000,000	Engineering & Procurement
KOC - Jurassic Gas Facility (JGF-1)	Ahmadi	Gas Processing	3,500,000,000	FEED
KOC - Kuwait Bay and Divided Zone Offshore Exploration	Various	Exploration	1,000,000,000	Engineering & Procurement
KOC - New 48" Crude Transit Line From North Kuwait To CMM	Northern Kuwait	Oil pipeline	70,000,000	EPC ITB
KOC - North Kuwait Gathering Center (GC) 24 Upgrade	Northern Kuwait	Gas Gathering Centre	150,000,000	FEED
KOC - North Kuwait Gathering Center (GC) 32	Northern Kuwait	Gas Gathering Centre	1,650,000,000	Engineering & Procurement
KOC - North Kuwait Manifold Gathering System for Gathering Centers (GC) 29, 30, 31	Northern Kuwait	Gas Gathering Centre	2,500,000,000	Construction
KOC - North Kuwait Manifold Group Trunkline (MGT) System	Northern Kuwait	Oil pipeline	800,000,000	Construction
KOC - Southeast Kuwait Replacement of Air System	Southeast Kuwait	Flowlines	100,000,000	EPC ITB
KOC - West Kuwait BS-171 Gas Sweetening Facility	West Kuwait	Gas Treatment Plant	400,000,000	EPC ITB
PIC - Olefins 3 Petrochemicals Plant	Al Zour	Petrochemical Plant	5,000,000,000	FEED



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تصل إلى ٦١ في المائة خلال الفترة حتى ٢٠٢١. ومن المتوقع أن تشهد النفقات التشغيلية المخصصة لخطوط أنابيب سائل الغاز نمواً بسيطاً يبلغ فقط ١٠ في المائة خلال الفترة ما بين عامي ٢٠١٧ و ٢٠٢١. وعلى الرغم من هذا التوجه، ستواصل خطوط أنابيب سائل الغاز الاستحواذ على أكبر حصة من النفقات التشغيلية الكلية خلال المدة المشمولة بالتوقعات، وذلك نظراً للقاعدة الكبيرة نسبياً التي تم إنشاؤها مقارنة بخطط أنابيب الغاز. غير أنه عقب الزيادة الهائلة في نشاط إنشاء خطوط أنابيب الغاز بين عامي ٢٠١٦ و ٢٠١٧، من المنتظر زيادة الحصة السوقية المخصصة لخطوط أنابيب الغاز خلال المدة المشمولة بالتوقعات لتبلغ ١٢ في المائة بعد أن كانت سبعة في المائة في ٢٠١٢-٢٠١٦.

وأيضاً كما الحال مع السنوات الخمس السابقة، ينتظر لنفقات العمليات، التي تضم الأنشطة الروتينية ذات الصلة بالتشغيل اليومي لمرافق خطوط الأنابيب (وتشمل المراقبة والتنظيف الكيميائي والكشط الروتيني)، أن تنال أكبر حصة من النفقات التشغيلية الكلية في الشرق الأوسط خلال المدة المشمولة بالتوقعات، وذلك بواقع ٥٩ في المائة من السوق. وقد أصبح التركيز ينصب على قطاع إدارة السلامة بشكل أخذ في التزايد، مع الأخذ في الاعتبار توسع القاعدة المنشأة وتقدم خطوط الأنابيب، ومن المنتظر أن يمثل ١٥ في المائة من النفقات التشغيلية في الشرق الأوسط خلال ٢٠١٧-٢٠٢١.

ولهذا فإنه على الرغم من توقعات هبوط النفقات الرأسمالية خلال السنوات الخمس المقبلة، تشير التوقعات إلى أن منطقة الشرق الأوسط ستظل لاعباً بارزاً في أنشطة الإنشاءات العالمية خلال السنوات الخمس المقبلة، حيث من المقرر البدء في تشغيل عدد من المشاريع خلال ٢٠١٧-٢٠٢١. غير أن افتقار الأمن إلى جانب التعقيدات الجيوسياسية التي تواجهها المنطقة تواصل وضع العقبات أمام نشاط الإنشاءات. وسوف يكون نمو النفقات التشغيلية في المنطقة مدفوعاً بتقدم شبكات خطوط الأنابيب والحاجة لإجراء أعمال الصيانة الأساسية، على أن تواصل نفقات العمليات الاستحواذ على أكبر حصة من السوق خلال ٢٠١٧-٢٠٢١.

إيران أحد المساهمين الرئيسيين في إنشاءات خطوط الأنابيب في الشرق الأوسط على مدار الأعوام الخمسة التالية، والتي تمتد بشكل رئيسي عبر خطوط التصدير إلى شمال وشرق البلاد. وقد عمل رفع العقوبات الدولية، ذات الصلة بالشأن النووي في ٢٠١٦، على فتح آفاق التطوير الذي سهل على الدولة الانفتاح على السوق لتصدير غازها إلى أوروبا عبر تركيا.

ويأتي مشروع خط أنابيب الغاز العابر للأناضول ضمن المشاريع الكبرى، والذي يسهم في تنويع مسارات إمداد دول غرب أوروبا بالغاز الطبيعي. وخط الأنابيب البالغ طوله ١٨٥٣ كيلومتراً (منها ١٨١٧ كيلومتراً خطوط برية) مصمم لنقل الغاز من حقل شاه دنيز ٢ في أذربيجان، ومناطق بحر قزوين الأخرى إلى أوروبا، وسوف يمر عبر تركيا وجورجيا قبل أن يتصل بخط أنابيب عبر الأذربيجاني على الحدود اليونانية. ومن المتوقع الانتهاء من إنشائه في ٢٠١٨. كما يوفر مشروع خط أنابيب الغاز العابر للأناضول بوابة أخرى محتملة لإيران لتصدير الغاز إلى مناطق غرب أوروبا.

وكما الحال مع السنوات الخمس السابقة، من المتوقع أن تستحوذ تكاليف الإنشاءات على أعلى حصة من النفقات الرأسمالية لمشاريع خطوط الأنابيب البرية في الشرق الأوسط خلال المدة المشمولة بالتوقعات، إذ من المتوقع أن تمثل ٥١ في المائة من الإنفاق الكلي خلال الفترة ما بين عامي ٢٠١٧ و ٢٠٢١. وبلي ذلك تكلفة خط الأنابيب والتي من المنتظر أن تمثل ٢٩ في المائة من النفقات الرأسمالية الإقليمية خلال السنوات الخمس التالية.

وقد زادت النفقات التشغيلية الإجمالية لخطوط الأنابيب البرية في الشرق الأوسط بمعدل نمو سنوي مركب يبلغ ثلاثة في المائة خلال الفترة ما بين ٢٠١٢ و ٢٠١٦، ومن المتوقع أن تواصل الزيادة حتى ١٥ في المائة خلال السنوات الخمس المقبلة لتبلغ ٤,٢ مليار دولار بحلول ٢٠٢١. وكما الحال مع المناطق الأخرى فإن الدوافع الكامنة وراء النفقات، وهي على وجه الخصوص تقدم شبكات خطوط الأنابيب والحاجة لإجراء أعمال الصيانة الأساسية، لم تتأثر كثيراً بانخفاض أسعار النفط.

وتتوقع «وست وود» أن تشهد النفقات التشغيلية المخصصة لخطوط أنابيب الغاز أكبر نمو لها بنسبة

الحصة السوقية لمناطق أخرى مثل شرق أوروبا والاتحاد السوفييتي السابق وآسيا.

ويظل الأمن حجر عثرة في طريق نشاط الإنشاءات في الشرق الأوسط. وأبرز مظاهر ذلك تغيير مسار خط الأنابيب الذي يربط بين العراق والأردن، والبالغ طوله ١٧٧٠ كيلومتراً لتجنب المنطقة الخاضعة لسيطرة «داعش» في العراق. فقد كان من المقرر في الأساس توجيه مسار خط الأنابيب من البصرة في جنوب العراق إلى حديثة في الشمال الغربي، ومنها إلى العقبة. غير أن المسار الجديد سيمر عبر النجف جنوب بغداد ثم يمتد بطول الحدود مع المملكة العربية السعودية، ثم يعبرها إلى الأردن. وهناك أيضاً عددٌ من التعقيدات الجيوسياسية التي كان لها تأثير على مشاريع خطوط الأنابيب البرية في المنطقة، مثل خط أنابيب الغاز الطبيعي المقرر للربط بين إيران وباكستان الذي يعد مثلاً رئيسياً على ذلك، خاصة أن المشروع قد شهد التأجيل عدة مرات بسبب صعوبات مالية متعلقة بفرض العقوبات الدولية على إيران، فضلاً عن الخلافات بين باكستان وإيران على أسعار الغاز.

غير أنه من المنتظر مواصلة تنفيذ عدد كبير من المشاريع في المنطقة على الرغم من هذا التراجع والمشاركة في النفقات الرأسمالية من الآن وحتى ٢٠٢١. وتضم المشاريع الرئيسية المرحلة الثانية لمشروع توسعة خط أنابيب الغاز الرئيسي بالمملكة العربية السعودية، والذي يتضمن مد شبكة خطوط الأنابيب بالمملكة إلى نحو ٨٣٨ كيلومتراً تقريباً لزيادة إمداد مصانع توليد الكهرباء ومرافق صناعة البتروكيماويات بالغاز. ومن المقرر أن يشمل برنامج غاز الفاضلي إنشاء خط أنابيب يبلغ طوله ٣٢٦ كيلومتراً تقريباً لنقل الغاز الطبيعي والنفط الثقيل من وإلى معمل غاز الفاضلي وواسط.

وفي عمان، يتضمن مشروع مجمع لوى للصناعات البلاستيكية إنشاء خط أنابيب لسوائل الغاز الطبيعي بطول ٣٠٠ كيلومتر. وسوف يربط هذا الخط مصنع سائل الغاز الطبيعي الجديد بفهود بوحد التفسير بالبحر الكائنة في صُحار.

وهناك مشروع IGAT IX العملاق لمد خطوط أنابيب الغاز بطول ١٨٦٠ كيلومتراً من عسلوية إلى الحدود التركية في إيران. هذا وتتوقع «وست وود» أن تصبح



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مستقبل سوق خطوط الأنابيب البرية في المنطقة

في هذا المقال، تقول كيتي سميث، الباحثة في مجموعة «وست وود جلوبال إنرجي»، إنه من المتوقع تراجع النفقات الرأسمالية على خطوط الأنابيب البرية في منطقة الشرق الأوسط خلال السنوات الخمس المقبلة، في حين تواصل النفقات التشغيلية الزيادة بفعل تقادم خطوط الأنابيب والحاجة إلى إجراء أعمال الصيانة الأساسية.

وأعمال التصميم الهندسية الأولية (FEED) للمشاريع الجديدة. ولهذا ينتظر أن تتراجع حصة الشرق الأوسط من النفقات الرأسمالية العالمية على نحو طفيف من ١٢ في المائة خلال المدة ما بين عامي ٢٠١٢ و ٢٠١٦ إلى ١٠ في المائة عبر السنوات الخمس المقبلة، وذلك لزيادة

في ٢٠٢١. ومن المنتظر أن يتراجع العدد الإجمالي للكيلومترات الإضافية، التي يتم إنشاؤها، بنسبة ٣٤ في المائة خلال نفس المدة، ليصل إلى ٤٠٦٧ كيلومتراً في ٢٠٢١. وقد تأثر الاستثمار في المنطقة بانخفاض أسعار النفط، وهو ما نتج عنه خفض عدد دراسات الجدوى

عقب الزيادة الكبيرة التي شهدتها النفقات الرأسمالية في ٢٠١٦، من المتوقع تراجع هذه النفقات لمشاريع خطوط الأنابيب البرية في الشرق الأوسط بمعدل نمو سنوي مُركب يبلغ ١٢ في المائة خلال الفترة ما بين عامي ٢٠١٧ و ٢٠٢١، لتبلغ ٣,٤ مليار دولار



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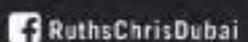
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توقعات بتحسين كفاءة الطاقة عبر التحول إلى الكهرباء

وفقا للتقرير الافتتاحي الصادر في ٤ سبتمبر/أيلول ٢٠١٧ بعنوان «مستقبل التحول في مجال الطاقة» لشركة «ديت نورسك فيريتاس»، سوف تشهد كفاءة الطاقة تحسنا أسرع من النمو الاقتصادي العالمي، وذلك نظرا لسرعة تحول نظام الطاقة العالمي إلى استخدام الكهرباء، والذي سيؤدي بدوره إلى استقرار الطلب على الطاقة بداية من ٢٠٣٠.

ووفقا للتقرير، ستواصل مصادر الطاقة المتجددة الصعود حتى تمثل نصف إمدادات الطاقة العالمية تقريبا بحلول ٢٠٥٠. وتشير التوقعات إلى وصول إمدادات الغاز العالمية إلى ذروتها في ٢٠٣٥ على أن تظل منفردة أكبر مصدر للطاقة بحلول منتصف القرن. وقالت الشركة في بيان لها: «إن العالم على موعد مع نقطة تحول. فمن المقرر استقرار الطلب على مصادر الطاقة بداية من ٢٠٣٠، مدفوعا بزيادة الكفاءة مع تطبيق التحول إلى استخدام الكهرباء على نطاق واسع. وهناك مساح حثيثة لخفض انبعاثات الكربون المنبعثة من مصادر الطاقة الحالية، ومن المتوقع أن تمثل الطاقة المتجددة ما يقرب من نصف موارد الطاقة بحلول ٢٠٥٠. غير أن الغاز سيمثل - منفردا - أكبر مصدر للطاقة حينذاك». وجدير بالذكر أن التحول إلى استخدام الطاقة سيُغير طريقة

إمداد الطاقة واستهلاكها في جميع أنحاء العالم وبخاصة في ظل الإقبال على موارد الطاقة المتجددة. هذا وتشير توقعات شركة «ديت نورسك فيريتاس» إلى أن الطاقة المتجددة وأنواع الوقود الأحفوري سينالان حصتين متساويتين من مجموعة مصادر الطاقة بحلول ٢٠٥٠. وسوف تعزز طاقة الرياح والخلايا الضوئية الشمسية توسعة نطاق استخدام الطاقة المتجددة، بينما من المتوقع أن يسبق الغاز النفط في ٢٠٣٤ ويصبح - منفردا - أكبر مصدر للطاقة. وأضافت الشركة أن الطلب على النفط سيكون ثابتا من ٢٠٢٠ حتى ٢٠٢٨، ثم ينخفض بصورة كبيرة بداية من هذه المرحلة عندما تكتسب المركبات الكهربائية زخما وتحظى بالإقبال. كذلك من المتوقع أيضا أن تبلغ تكلفة الطاقة العالمية أقل من ثلاثة في المائة من إجمالي الناتج المحلي العالمي، مقارنة بالمستوى الحالي الذي يبلغ ٥ في المائة. ومن المقرر انخفاض تكاليف توليد طاقة الخلايا الضوئية الشمسية والرياح بنسبة ١٨ في المائة و١٦ في المائة على التوالي. وأردفت الشركة قائلة: «لقد أبدت صناعة النفط والغاز استجابة كبيرة تجاه انخفاض الأسعار الحالي، غير أن مصادر الطاقة المتجددة ستعزز أداء التكلفة بوتيرة أسرع، مستفيدة من تأثير «منحنى التعلم». وسوف

ينتظر للطاقة المتجددة أن تمثل ما يقرب من ٥٠ في المائة من مجمل الطاقة في ٢٠٥٠

تتكافأ تكلفة المركبات الكهربائية مع تلك الخاصة بالمركبات التي تعمل بمحركات الاحتراق الداخلي في ٢٠٢٢، وبحلول ٢٠٣٣، سيكون نصف مبيعات المركبات الخفيفة الجديدة على مستوى العالم من المركبات الكهربائية».



مفكرة رجال الأعمال ٢٠١٧

أكتوبر/تشرين الأول

- 8 - 9 ... المنتدى الثالث للصحة والسلامة والأمن 2017 دبي
9 - 11 ... مؤتمر ومعرض الشرق الأوسط لهندسة المعالجة المنامة
15 - 18 ... معرض الكويت للنفط والغاز الكويت
16 - 17 ... مؤتمر البصرة للنفط والغاز والبنية التحتية بيروت

نوفمبر/تشرين الثاني

- 6 - 7 ... معرض الخليج للأمن الداخلي دبي
13 - 16 ... معرض أبوظبي الدولي للنفط أديك 2017 أبوظبي

تنمية نفط عمان تبرم عقودا جديدة لتعزيز سلسلة التوريد في البلاد

إجمالي عدد العمانيين العاملين في الشركتين نحو ١٠٠ شخص. وأبرمت الشركة أيضا اتفاقيتين مع شركة «تكسو فيت تريدينج»، إحداهما مع شركة «ووتشو فالف كومباني» الصينية لتصنيع الصمامات الكروية، والأخرى مع شركة «جين - تيك كونترولز» الهندية لتصنيع الصمامات أحادية الشفة. ووافقت كلتا الشركتين الأجنبيةتين على إقامة مرافق إنتاج في سلطنة لتصنيع المكونات الرئيسية بعد ثلاث سنوات من سريان هاتين الاتفاقيتين.

ويُذكر أنه حتى الآن وطّنت الشركة توريد وتصنيع السلع والخدمات في عدد من المجالات الرئيسية، مثل سقالات والأنابيب الكربونية ومعدات هندسة الآبار. وتوفر البوليمر لعمليات الاستخلاص المعزز للنفط. وتجدر الإشارة إلى إسناد ما يقرب من ٤١ في المائة من إجمالي عقود شركة تنمية نفط عمان لشركات محلية، بينما تم إسناد نحو ٥٣ في المائة من عقود هندسة الآبار لشركات مجتمع المحلي، وهي تعد بين أعلى النسب في المنطقة.

أبرمت شركة تنمية نفط عمان صفقتين بقيمة ٢٥٣,١ مليون دولار لتوطين توفير معدات حيوية لقطاع النفط والغاز. وقد أبرمت الشركة اتفاقيتين مع شركة فولتامب العمانية للمحولات، ومقرها الرسيل، لتوفير محولات الطاقة، ومع شركة الجزر للمحولات والملفاتيج الكهربائية، ومقرها المعبيلة، لتوريد محولات رؤوس الآبار. وبلغ



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تقليدي، ولم يتم اكتشاف النفط في هذا الحقل. وذكرت أرامكو أن مشاريع مشتركة ضمت أرامكو السعودية وغيرها من الشركات الدولية الأخرى قامت باكتشاف حقل النفط، غير أنها عجزت عن العثور على آثار للنفط والغاز. وقالت الشركة في بيان لها لـ «رويترز»: «إن معالجة البيانات جارية. وتغطي المنطقة بعض المناطق التي تخلت عنها بعض المشاريع المشتركة». وأورد المصدر أن شركة أرامكو شكلت أربعة تحالفات في ٢٠٠٣ و٢٠٠٤ لاستكشاف مناطق شاسعة من صحراء الربع الخالي، غير أنها توقفت عن البحث بعد أن عجزت عن العثور على كميات تجارية من الغاز. هذا وتأمل أرامكو في أن تُحسّن التقنية السيزمية الجديدة فرص التوصل إلى كشف ناجح. ولم توضح الشركة ما إذا كان من شأن أنشطة الاستكشاف الجديدة التأثير على تقدير الشركة لاحتياطياتها من مكثفات النفط والغاز.

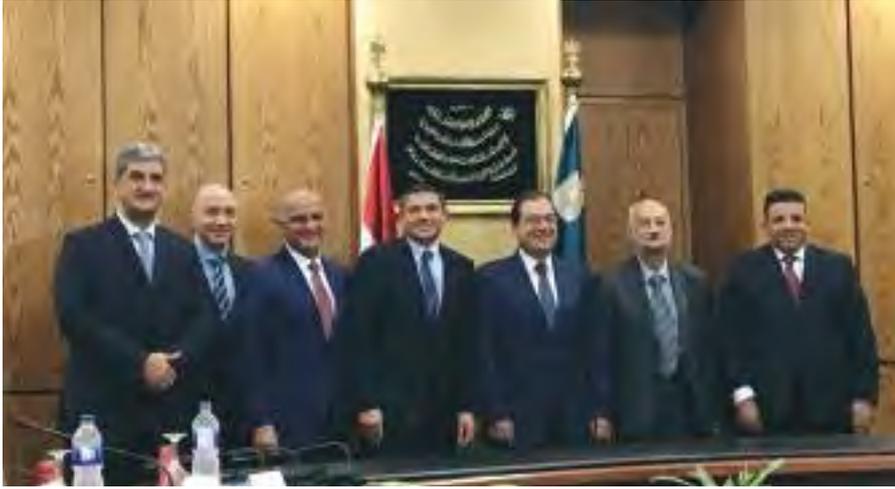


تأمل أرامكو في مزيد من الاستكشافات الناجحة في الربع الخالي

أرامكو السعودية تعيد استكشاف الربع الخالي

تستخدم أرامكو السعودية تقنيات جديدة لإعادة استكشاف بعض المناطق في صحراء الربع الخالي، ساعية بذلك إلى تعزيز احتياطياتها من النفط والغاز قبل أن تطرح أسهمها للبيع المقرر في أواخر ٢٠١٨. وذكرت أرامكو في بيان لها أن فريقا مكونا من نحو ٩٠٠ شخص يستخدمون تقنية سيزمية متطورة لاستكشاف ١٥ ألفا و٤٠٠ كيلومتر حول حقل الطريقاء في المملكة العربية السعودية الذي اكتُشف عام ٢٠١٣، وهو حقل غاز بري

بيكر هيوز تفوز بعقد تنفيذ الخدمات البحرية لحقل ظهر



مراسم توقيع العقد

أعلنت شركة بيكر هيوز، إحدى شركات جنرال إلكتريك، عن توقيع عقد مع شركة «بتروبل» لتنفيذ المرحلة الثانية من مشروع تطوير حقل ظهر العملاق والواقع في البحر المتوسط قبالة السواحل المصرية. وستتولى شركة «بيكر هيوز»، بوصفها شريكا طويل الأجل لمصر، مسؤولية إدارة المشروع وأعمال الهندسة والتصنيع والتوريد والإنشاء والاختبار والنقل لنظام الإنتاج البحري الذي يشمل سبعة عناصر، ونظم ربط ونظم تحكم سطحية وبحرية طويلة المدى، ونظم HIPPS SemStaro (المحافظة على الضغط بمستويات سلامة عالية)، إلى جانب نظم وأدوات الصيانة. كما ستدعم الشركة عمليات الإنشاء والتكيب والإعداد للتشغيل.

من جانبه، أكد المهندس طارق الملا، وزير البترول والثروة المعدنية، على أن «تعظيم الاستفادة من موارد الطاقة المحلية وتحسين كفاءة إمداداتها من أهم عناصر رؤية الدولة المستقبلية. ستمكن من زيادة قيمة وكفاءة هذه الموارد وصولاً إلى اقتصاد أكثر استدامة وكفاءة في مجال الطاقة من خلال مشروع تحديث وتطوير القطاع بالشراكة مع شركات مثل «بيكر هيوز جي إي». ويلعب

حقل ظهر دورا أساسيا في تطوير موارد مصر المحلية من الطاقة وزيادة عوائدها ومهوها الاقتصادي». و«بتروبل» هي شركة مشتركة بين الشركة المصرية للزيت المصري (أيوك) التابعة لشركة «إيني» الإيطالية في مصر، والهيئة المصرية العامة للبترول. وهي مسؤولة عن تطوير حقل ظهر بالنيابة عن شركة «بتروشروق»، وهي شركة مشتركة بين الشركة المصرية القابضة للغازات الطبيعية و«إينوك». ويتلقى المشروع الدعم الهندسي من المملكة المتحدة وإيطاليا والنرويج. وسيتم تصنيع الهياكل الفولاذية في الإسكندرية، مما سيدعم العمالة المحلية في مصر، إلى جانب المملكة المتحدة والنرويج وإيطاليا. وبالإضافة إلى ذلك تحصل خدمات الإدارة على الدعم من مصر والمملكة المتحدة.

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المكتب الرئيسي:
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University House, 11-13 Lower
Grosvenor Place
London SW1W 0EX UK
هاتف: ٧٨٣٤ ٧٦٧٦ (+٤٤)
فاكس: ٧٩٧٣ ٠٠٧٦ (+٤٤)

مكتب الشرق الأوسط الإقليمي:
Alain Charles Middle East FZ-LLC
Office 112, Loft 2B
صندوق بريد: ٥٠٢٣٠٧
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المحتويات

القسم العربي

أخبار

- ٥ أرامكو السعودية تعيد استكشاف الربع الخالي
- ٥ بيكر هيوز تفوز بعقد تنفيذ الخدمات البحرية لحقل ظهر
- ٧ توقعات بتحسين كفاءة الطاقة عبر التحول إلى الكهرباء
- ٧ تنمية نفط عمان ترم عقوداً جديدة لتعزيز سلسلة التوريد في البلاد

تحليلات

- ٩ مستقبل سوق خطوط الأنابيب البرية في المنطقة

ملخص محتويات القسم الإنجليزي:

تقارير خاصة: الكويت، معرض الكويت للنفط والغاز.

تقنيات: المكتفات، مد الأنابيب.

تكنولوجيا المعلومات: اتصالات حقول النفط.

ADVERTISERS INDEX

Company	Page
Aggreko (Middle East) Ltd	75
AkzoNobel UAE Paints L.L.C.	7
ALAA Industrial Equipment Factory Co.	35
Bauer Kompressoren GCC FZE	31
Bell Energy	38
Byrne Equipment Rental LLC	41
CompAir	13
Dolphin Heat Transfer (L.L.C.)	10
Dow Chemical IMEA GmbH	11
Faccin srl	27
Fairdeal Group Marine Services LLC	47
Flir Systems ME FZE	43
Gas & Oil Field Services Co (GOFSCO)	2
Harlow DMCC - Dubai	15
Hytera Communications Co. Ltd	39
Inmarco FZC	24
International Building Systems Factory Co Ltd	29
Jotun Paints UAE Ltd (LLC)	5
Kaesar Kompressoren FZE	9
Karcher FZE	21
KCI - Kinetics Controls & Innovation Ltd	55
Khalid Y. Al Fulaij & Partners Co.	53
M.A. Qaiser Industrietechnik GmbH	28
ME3 Events Middle East Energy Events FZ LLC(MEPEC 2017)	67
Messe Frankfurt Middle East GmbH	73
Q80 Valve Industries	51
Quintiq Applications B.V.	18
Reflex Marine Ltd	25
Ruths Chris Steak House (Fine Dining Ltd)	69
Sandvik Process Systems	33
Saudi Leather Industries Company Ltd	45
Shree Steel Overseas FZCO	14
Suraj Limited	19
Swissphone Wireless AG	57
The Development Initiative Ltd	23
Topline Pipeline & Process Engineers	49
Trans Asia Pipeline Services FZC	17



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- **بيكر هيرز تفوز بعقد تنفيذ الخدمات البحرية لحقل ظهر**
- **توقعات بتحسين كفاءة الطاقة عبر التحول إلى الكهرباء**
- **تأمية لخط عمان تبرم عقوداً جديدة لتعزيز سلسلة التوريد في البلاد**

على الرغم من توقعات هبوط النفقات الرأسمالية خلال السنوات الخمس المقبلة، تشير التوقعات إلى أن منطقة الشرق الأوسط ستظل لاعباً بارزاً في أنشطة الإنشاءات العالمية خلال السنوات الخمس المقبلة.