

# Oil Review

Oil · Gas · Petrochemicals

## Middle East

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**Saudi Aramco -  
focusing on  
sustainability**

- Buoyant mood at ADIPEC
- Improving water injection in fractured reservoirs
- Latest pipeline integrity solutions
- Reaching the next frontier with AI and advanced analytics
- Attracting millennials into oil and gas

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## → Editor's note

HOW CAN ENERGY providers satisfy the growing global energy demand while cutting emissions in the face of growing climate change pressures and environmental scrutiny? This is the dilemma that has come to the top of the agenda for oil and gas companies, not least Saudi Aramco, which has sharpened its focus on sustainability, as we discuss on p26. Promoting sustainability is one of the hot topics on the agenda at IPTC 2020, which will be hosted by Saudi Aramco in January. See our preview on p24. The mood at ADIPEC was buoyant this year (see p30), with exhibitors positive about prospects for developing their business in the region. The event saw a number of new product launches and attracted a record number of visitors. As ever, we bring you all the latest news and product developments, and it just remains for me to wish our readers and supporters all the very best for the festive season and New Year.

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Front cover: *The Shaybah field, courtesy of Saudi Aramco*

## → Executives' Calendar 2020

JANUARY			
13-15	<b>International Petroleum Technology Conference (IPTC)</b>	DHAHRAN	<a href="http://www.2020.iptcnet.org">www.2020.iptcnet.org</a>
13-16	<b>World Future Energy Summit</b>	ABU DHABI	<a href="http://www.worldfutureenergysummit.com">www.worldfutureenergysummit.com</a>
19-21	<b>Intersec</b>	DUBAI	<a href="http://www.intersecexpo.com">www.intersecexpo.com</a>
FEBRUARY			
2-4	<b>Kuwait Health, Safety &amp; Environment Forum</b>	KUWAIT	<a href="http://www.hse-forum.com">www.hse-forum.com</a>
11-13	<b>Egypt Petroleum Show</b>	CAIRO	<a href="http://www.egypts.com">www.egypts.com</a>
18-20	<b>ME-TECH 2020</b>	ABU DHABI	<a href="http://www.europetro.com/events">www.europetro.com/events</a>
25-26	<b>Oman Health, Safety &amp; Environment Forum</b>	MUSCAT	<a href="http://www.hse-forum.com">www.hse-forum.com</a>
25-27	<b>IP WEEK</b>	LONDON	<a href="http://www.ipweek.co.uk">www.ipweek.co.uk</a>
MARCH			
2-3	<b>Iraq Oil &amp; Gas Show</b>	BAGHDAD	<a href="http://www.iogsiraq.com">www.iogsiraq.com</a>
2-4	<b>MERTC</b>	MANAMA	<a href="https://mertc.wraconferences.com">https://mertc.wraconferences.com</a>
3-5	<b>Middle East Energy (MEE) 2020</b>	DUBAI	<a href="http://www.middleeast-energy.com">www.middleeast-energy.com</a>
9-11	<b>Oman Petroleum &amp; Energy Show</b>	MUSCAT	<a href="http://www.omanpetroleumandenergyshow.com">www.omanpetroleumandenergyshow.com</a>
16-19	<b>GEO 2020</b>	MANAMA	<a href="http://www.geo-expo.com">www.geo-expo.com</a>
24-26	<b>OpEx MENA 2020</b>	MANAMA	<a href="http://www.europetro.com">www.europetro.com</a>
30-31	<b>Middle East Petroleum &amp; Gas Conference</b>	MANAMA	<a href="http://www.mpgc.cc">www.mpgc.cc</a>

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

### Kuwait Health, Safety & Environment Forum to renew the focus on health & prevention

THE KUWAIT HEALTH, Safety & Environment Forum 2020, to take place from 2-4 February at the JW Marriott Hotel Kuwait City, will once again bring together health and safety professionals, government regulators, policy makers and solutions providers to explore topical health, safety and environment issues.

Held under the patronage of Kuwait's Ministry of Health, and in association with Kuwait National Guard and Kuwait Fire Services, the Forum, which builds on the success of the highly acclaimed inaugural event held in September 2018, will provide a platform for the sharing of insights, expertise and best practice on critical issues across the spectrum of health and prevention, safety and security, environment, risk management and technology.

Despite rapid advances in the health and safety sector, Kuwait faces a range of occupational health challenges such as reducing environmental hazards, improving the effectiveness of health policies, addressing communication issues and promoting healthy lifestyles and behaviours that will encourage a safer work environment and advance worker wellbeing. As Prof. Mohamed Kamel, Ministry of Health, Kuwait commented at



Image Credit: Alain Charles Publishing

*Prof. Mohamed Kamel, Ministry of Health Kuwait speaking at the 2018 event.*

the 2018 event, "You cannot be a safe worker if you are not a healthy worker."

There is also a big push on sustainable healthcare, tying in with the unified Gulf Health Strategy and the UN Sustainable Development Goals (SDGs), to raise standards of health and wellbeing throughout the country.

This year's event will have a renewed focus on health and prevention, and will be preceded by a one-day workshop on Hospital Occupational Health and Safety Management on 2 February, prepared and presented by the Ministry of Health, which will enable those attending to obtain CME points.

The Forum itself will address subjects such as

health promotion; sustainable healthcare as a way forward to achieve the unified Gulf Health Strategy; improving competency and safety in high rise construction sites; protecting workers with 3D modelling; driving safety; leadership and safety culture; mitigating risks in hostile environments; IoT for monitoring potential workplace hazards; the effects of greenhouse gases on health and environment; and preventing environmental contamination by hydrocarbons.

The line-up of eminent speakers includes Dr Ahmed Al-Shatti, director, Occupational Health Department, Ministry of Health, Kuwait; Nasser Al-Buhairi, chief security officer and head of Emergency Coordination Unit, Kuwait Oil Company; Dr Ghaida Mubarak Al-Shoraian, senior general practitioner, Kuwait National Petroleum Company; Qusai Al Shatti, acting director-general, Central Agency for Information Technology (CAIT); Dr Muhammad Alamgir, HSE manager, Petrofac, Kuwait; Dr Ahmed Hajji, senior doctor, Petrochemical Industries Company KSC; and Jason Woods, Middle East & India representative for the International Powered Access Federation (IPAF).

For further information and to register, see the website at [www.hse-forum.com](http://www.hse-forum.com).



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## World Future Energy Summit to advance debate on sustainable energy

THE WORLD FUTURE Energy Summit (WFES) will be held at Abu Dhabi National Exhibition Centre (ADNEC), from 13-16 January 2020.

The annual event, hosted by Masdar and part of Abu Dhabi Sustainability Week, is the leading global industry event and exhibition for future energy, cleantech and sustainability. Bringing together government and business leaders, 800 specialist exhibitors and 33,500 visitors from 170 countries, it showcases pioneering technologies and ground-breaking thinking in energy, energy efficiency, water, solar, waste and smart cities.

A core feature will be the Energy Expo & Forum, which aims to provide a global meeting point for governments, energy companies, utilities providers, nuclear agencies and independent power providers, while sharing the new thinking and technologies that are increasingly instrumental to the global transition to clean energy.

The GCC is rapidly adopting renewable energy generation to meet power demand, lower carbon emissions and reduce costs. The UAE, which already hosts 68 per cent of the GCC's installed renewable energy capacity, by 2050 hopes to generate 50 per cent of its power from renewables in line with its long-term Energy Strategy.

"The Energy Expo & Forum provides an unparalleled platform to support renewable energy adoption, and showcase innovations ranging

from solar PV panels and wind turbines, to hydrogen fuel cells and waste-to-energy solutions," said Grant Tuchten, group event director, World Future Energy Summit.

"Our forum programme is an opportunity to share knowledge and best practice around the latest developments, including those in energy storage, smart grids, AI and blockchain, and a host of hot topics in sustainability."

Worldwide research by BP shows that global renewable energy power generation has posted double-digit annual growth in recent years, including 14 per cent from 2017 to 2018, while IRENA expects that global power supply is set to double by 2050, with renewable energy – especially across solar, wind, and hydroelectric power, along with bioenergy and geothermal – meeting 86 per cent of new power demand. IRENA adds that renewable energy adoption could boost GDP by 2.5 per cent by 2050.

Yousif Al Ali, acting executive director for Clean Energy at Masdar, said, "The Energy Expo & Forum is an extremely valuable platform for the renewable energy projects, technologies and innovative solutions that are driving decarbonisation of the power sector, particularly in emerging markets like the Middle East and North Africa, and Asia."

Energy Expo exhibitors are set to include government authorities and entities such as the UAE Ministry of Energy and Industry, the Abu Dhabi National Energy Company PJSC (TAQA), and the Kingdom of Saudi Arabia's Power and Water Utility Company for Jubail and Yanbu (Marafiq); energy companies such as BP, ExxonMobil, Total, and Dubai-based AMEA Power; technology providers such as Lockheed Martin and the Shanghai Electric Group; and the global quality assurance and risk management company DNV GL from Norway.

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



Image credit: Reed Exhibitions

## Intersec 2020 to introduce innovative new features

MORE THAN 1,300 exhibitors from 54 countries, and 34,000 visitors from 128 countries, are expected to attend Intersec 2020, the world's largest trade fair for security, safety, and fire protection, which takes place from 19-21 January at the Dubai International Convention and Exhibition Centre.

The 22nd edition spans seven show sections of commercial security, fire and rescue, safety and health, homeland security and policing, perimeter and physical security, cyber and information security, and smart home and building automation.

A debut feature for 2020 is the Intersec Arena, an interactive theatre-style setting that connects solution seekers with developers of game-changing innovations. The Arena will offer insights into new technologies that address cross-sector industry-specific challenges while educating end-users on the vital considerations when purchasing specific product categories.

Other new features include the Intersec Government Summits, a series of roundtable discussions led by major government authorities; the Intersec Energy Industry Focus Day that analyses new approaches to safety, security and fire protection in the oil and gas industry; and a series of workshops and certification courses in the Intersec Academy. The Intersec Future Security Summit returns for its second year, focusing on disruptive technologies integrating digital and physical security.

Issues of innovation, environmental considerations and regulatory compliance will be the headline issues to be addressed at Intersec 2020's expansive series of conferences, workshops, roundtables and live demos.

Returning highlights include a drones pavilion and an indoor drone zone, a safety design in buildings pavilion in the fire and rescue section, as well as an outdoor demonstration zone of the latest fire rescue applications in action.

The Middle East fire safety systems and equipment market alone will register 2.6 per cent compound annual growth to 2025 accumulating a combined value of US\$2.3 billion, according to a recent 6Wresearch report, with the UAE, Turkey and Saudi Arabia being the main drivers for the Middle East. Growth



Image credit: Messe Frankfurt

projections are being attributed to economic growth and an increasing demand for sophisticated detection and fire-fighting systems, particularly from the commercial and industrial buildings sector.

Mohammed Al Zaben, head of Sales – Middle East & North Africa at Apollo Fire Detectors, said, "The fire industry as a whole is adopting new technologies in many areas: better firefighting equipment, improved fire simulation to design safer buildings and better use of big data to track and predict fires."

The Middle East commercial security market is also predicted to record positive growth over the coming years, mainly driven by increasing infrastructure development and stringent regulatory policies, and is fuelling demand for super-smart high-tech surveillance, access control and intrusion detection solutions.

Intersec 2020 is held under the patronage of His Highness Sheikh Mansour bin Mohammed bin Rashid Al Maktoum, and supported by the Dubai Police, Dubai Civil Defence, the Dubai Police Academy, SIRA, and the Dubai Municipality.

Further information is available at [www.intersecexpo.com](http://www.intersecexpo.com).



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## Agreement for Ethylene Dichloride facility

THE ABU DHABI National Oil Company (ADNOC) has signed a Framework Agreement with Reliance Industries Limited (RIL) to explore development of an Ethylene Dichloride facility in Ruwais.

Under the terms of the agreement, ADNOC and RIL will evaluate the potential creation of a facility that manufactures EDC adjacent to ADNOC's integrated refining and petrochemical site in Ruwais, Abu Dhabi and strengthen the companies' existing relationship supporting future collaboration in petrochemicals.

ADNOC would supply ethylene to the potential joint venture and provide access to world-class infrastructure at Ruwais, while RIL will deliver operational expertise and entry to the large and growing Indian vinyls market, in which it is an important participant.

The Agreement advances ADNOC's ambition to expand downstream portfolio and international market access as part of its 2030 growth strategy.



Image credit: ADNOC

## Exploration uptick expected in Lebanon

THE DEADLINE FOR submitting bids for Lebanon's second licensing round, which covers Blocks 1,2,5,8 and 10, is 31 January 2020.

The Eastern Mediterranean is now a hot region of interest, and a relatively unexplored swathe off the coast of Lebanon – which is surrounded by known hydrocarbon systems – offers great promise, says Rystad Energy in its latest update.

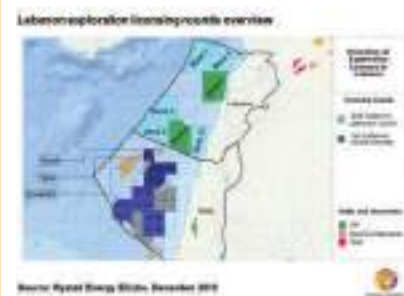


Image credit: Rystad Energy

### Exploration licenses in Lebanon overview.

The Lebanese government estimates that the offshore oil and gas frontier areas in the East Mediterranean may hold around 25 trillion cubic feet of natural gas reserves. An initial exploration well is expected to be drilled in block 4 by the end of 2019, or in early 2020.

Upcoming licensing rounds come at a time when the region is in the midst of ramping up local production to meet domestic energy demand. A major discovery would be a welcome financial boon for Lebanon, which faces a severe economic crisis and chronic power shortages, in addition to the influx of immigrants as a result of the Syrian crisis.

"The lack of exploration in the area at present is due to a combination of two factors; insufficient technical understanding of the acreage, and increasing political unrest," said Palzor Shenga, a senior analyst at Rystad.

"This investment upsurge in the coming years will likely be driven by new drilling contracts, licensing awards, and future bid rounds," remarked Taiyab Zain Shariff, an analyst on Rystad Energy's upstream team. "Most of the spending in Lebanon will be driven by offshore deep and frontier areas, which are believed to hold similar petroleum systems as seen in neighbouring countries."

Shenga commented, "It will still take years to develop the infrastructure required to produce and distribute any additional reserves found offshore Lebanon."

## Gazprom Neft increases production in Iraq

GAZPROM NEFT SUBSIDIARY Gazprom Neft Middle East has produced its three-millionth tonne of oil since starting commercial production at the Sarqala field in the Kurdistan Region of Iraq (KRI).

The total cumulative production at the Sarqala field has reached three million tonnes, or 23 mmbbl of oil, as at December 2019. Daily liquid hydrocarbon production at this asset is currently running at 4,000 tonnes of oil or 30,500 bpd.

First oil was obtained at the Garmian block (which the Sarqala field is part of) in 2011, with commercial crude shipments commencing in 2015, following the commissioning of the Sarqala-1 well. A second well was commissioned in 2018, with a third due to come online in 2019.

Surface facilities and infrastructure have been significantly expanded in the course of developing this field. Final works on expanding the central processing facility (CPF) are expected to be completed by end-2019 — production throughput having reached 35,000 bpd.

## Dubai firm to set up US\$40mn chemical terminal at Jebel Ali Port

AQUACHEMIE MIDDLE EAST, a regional chemical distributor with a supply chain network and manufacturing base across the GCC region, has announced plans to build a US\$40mn chemical terminal facility at Jebel Ali Port in Dubai, the UAE.

AquaChemie Middle East has signed an agreement with consultancy company Mott MacDonald for the design, engineering and project management of the chemical terminal to be commissioned by mid-2021.

The new chemical terminal will leverage its prime location at Jebel Ali Port, operated by DP World, including multiple jet pipelines, along with other critical existing utility and building support infrastructure.

According to the company, the new chemical terminal will have a bulk storage tank for liquid hydrocarbons with a total capacity of approximately 30,000 cu/m along with day tanks, chemical processing units and automated drum lines.

It will include tanker loading-unloading gantry with top loading arms, covered warehousing for storage of NFPA class 1B and C chemicals, separate dry goods storage area, pump house and main hose exchange station, separate road tanker entrance with weighbridge, loading and unloading ramp for forklift operation, office block with control room, dedicated road tankers and large trailer truck fleet, and a fully equipped firefighting unit.



Image credit: AquaChemie Middle East

*AquaChemie said the facility will serve as a strategic gateway hub to enable vital petrochemical trade across the GCC region.*





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## Diamond Offshore Drilling selects ITC Global for rig communications contract

ITC GLOBAL, A provider of satellite communications to remote and harsh environments, has been selected by Diamond Offshore Drilling to deliver connectivity for corporate networks, advanced client services and crew welfare applications on 10 rigs across its globally dispersed fleet of offshore drilling rigs.

Diamond Offshore Drilling, a leading player in the oil and gas industry, provides contract drilling services to the energy industry around the globe.

The agreement will include services for rigs operating in locations around the globe. ITC Global will complete the installation of new stabilised antenna systems on each rig to deliver high-speed data services.

Custom connectivity solutions include very small aperture terminal (VSAT) technology, along with long-term evolution (LTE) capabilities, enabling a seamless transition between technologies as needed.

This will enable the fleet to manage essential

business communications across its corporate network, advanced client services and remote-operability applications, as Diamond seeks to maximise efficiency across its global operations. Initial facilities are currently underway and are expected to be completed by 2020.

Richard Elson, vice-president of Global Sales at ITC Global, said, "The organic synergies between our organisations create mutual success in striving towards digital transformation to enhance drilling operational efficiencies."

## Saudi Aramco lists on the Tadawul

SAUDI ARAMCO OFFICIALLY listed on the Saudi Stock Exchange (Tadawul) on 11 December, marking the successful Initial Public Offering (IPO) of the company.

The offering process, which concluded on 4 December, generated subscriptions by more than five million institutional and individual subscribers of US\$119bn and generated proceeds of US\$25.6bn, making it the world's largest IPO.

Saudi Aramco's shares jumped 10 per cent on the first day of trading, taking the oil giant's market value to nearly US\$1.9 trillion, making it comfortably the world's most valuable listed company.

Yasir Othman Al-Rumayyan, chairman of the Board of Directors of Saudi Aramco, said, "This is a proud and historic moment for Saudi Aramco and our majority shareholder, as Saudi Aramco begins life as a listed company on Tadawul, together with all our new individual and institutional shareholders here in the Kingdom, in the region and around the world.

"Today's milestone underlines the Kingdom's commitment to nurturing a strong capital market and demonstrates further significant progress in delivering Vision 2030 – the Kingdom's transformation, economic growth and diversification programme."

Amin H. Nasser, president and CEO of Saudi Aramco, said, "Saudi Aramco's trading debut on Tadawul marks the completion of the world's largest IPO and the beginning of an important new chapter in our history.

"Building on our low-cost production and our reliable supply of low carbon-intensity crude oil to our customers, we will remain focused on providing our shareholders with resilient value creation through crude oil price cycles."

The listing is central to the Kingdom's diversification plans, as the proceeds will go into the Public Investment Fund (PIF), which is expected to increase capital spending within the domestic economy significantly.

## New ESP facility opens in Oman



The inauguration of the new facility.

Image Credit: PDO

PETROLEUM DEVELOPMENT OMAN (PDO) in collaboration with Schlumberger Oman & Co. LLC, has inaugurated the US\$26mn Oman Assembly, Repair and Testing (ART) Centre in Nizwa Industrial Estate.

The state-of-the-art Oman ART Centre, which will be the largest artificial lift facility for Schlumberger in the region, specialises in producing artificial lift equipment for the oil and gas industry, including electrical submersible pumps (ESPs), gauges and accessories. In addition, the facility will provide maintenance of ESP components, tools and power cables.

In line with the Schlumberger commitment to Omanisation, the facility will employ 20 Omanis, which approaches 80 per cent of the total employment during the first operational year, a percentage which is expected to increase in the future.

PDO's External Affairs and Value Creation director Abdul-Amir Al Ajmi said, "The Oman ART centre will support PDO's operations through boosting production, creating more jobs and training opportunities, saving costs, enabling custom-made solutions and adequate lead-time delivery of goods and services, and mainly enhancing performance."





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## UG/LR 002/2019

### ADDENDUM NO.2 TO NOTICE OF REQUEST FOR QUALIFICATION FOR THE SECOND LICENSING ROUND FOR PETROLEUM EXPLORATION, DEVELOPMENT AND PRODUCTION IN UGANDA

All potential and interested parties for the Second Licensing Round are hereby informed of slight adjustment of timelines for schedule of activities in the Request for Qualification (RFQ) Stage. The extension has been necessitated to allow you more time to prepare your applications and the adjusted schedule of activities for the RFQ stage is henceforth.

Activity	Date
a. Closing date for receipt of Applications for Qualification	31st December 2019
b. Evaluation of Expressions Applications for Qualification	06h - 20th January 2020
c. Display of Qualified Applicants	21st -24th January 2020
d. Issue of Request for Proposal/ bidding document to qualified applicants	28th -31st January 2020

The Request for Qualification Documents will be issued to interested applicants upon payment of then on-refundable. Application fee of USD20,000 (US Dollars Twenty Thousand only) to the Bank of Uganda through the following account detail:

Account Name: Uganda Petroleum Fund  
 Bank Name: Bank of Uganda  
 Account Title: Uganda Petroleum Fund - USD  
 Account No: 003300328400010  
 Swift Code: UGBAUGKA

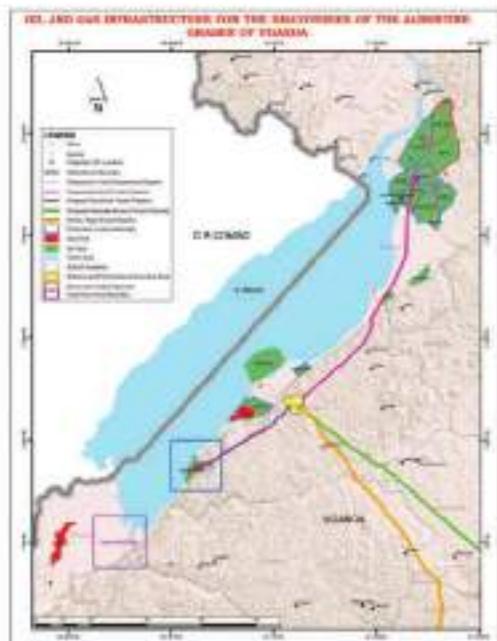
Sealed Applications for qualification must be delivered to the address below at or before **31st December, 2019 at 10:00am** Local time.

#### The Permanent Secretary

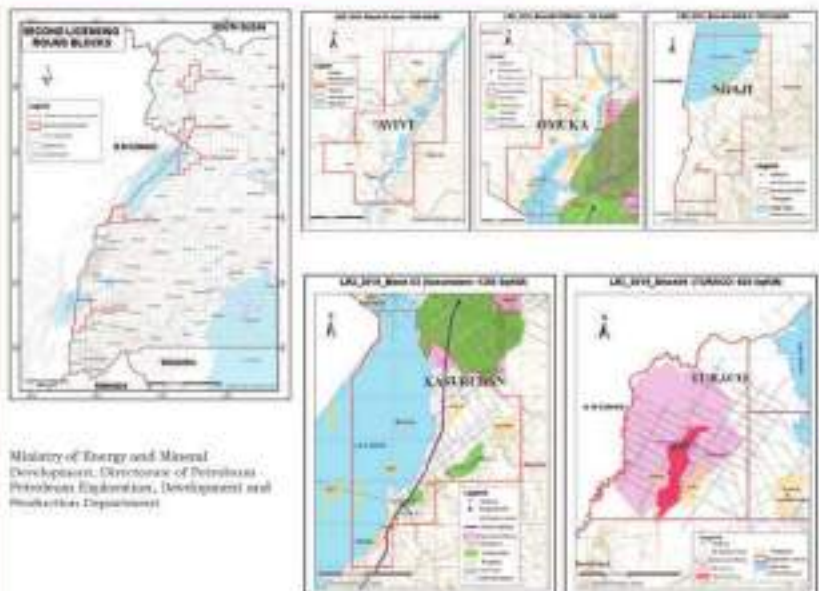
#### Ministry of Energy and Mineral Development

Attn: The Manager, Second Licensing Round, Petroleum Exploration, Development and Production Department, Plot 21-29, Johnstone Road, P.O. Box 9 Entebbe, Uganda

Email: [secondlicensing@petroleum.go.ug](mailto:secondlicensing@petroleum.go.ug) Website: <https://www.petroleum.go.ug>



THE SECOND LICENSING ROUND FOR PETROLEUM EXPLORATION IN UGANDA



## Total to participate in Waha concessions, Libya

TOTAL AND NATIONAL Oil Corporation (NOC), with the agreement of the Government of Libya, have signed an agreement to implement Total's participation in the Waha concessions, located in the Sirte Basin in Libya.

Under the terms of the agreement, Total will assist NOC in accelerating the development of the Waha concessions by providing its technologies and expertise; by developing the North Gialo and NC 98 fields, which are expected to add production of 180,000 boe/d; and by supporting social responsibility programmes carried out by NOC in the areas adjacent to oil operations. Total will finance contributions of US\$70mn at the outset, US\$30mn when North Gialo comes on stream and US\$30mn when NC 98 comes on stream.

Total will also carry out local economic development programmes, for a global amount of US\$20mn, over a four year period.

In 2018, Total acquired a 16.33 per cent working interest in the six Waha concessions by the purchase of Marathon Oil Libya Limited (MOLL), a wholly owned affiliate of the US-based Marathon Oil Corporation. The Waha concessions currently produce around



Image Credit : Shutterstock

**Total will help to accelerate the development of the Waha concessions.**

350,000 boe/d. The acquisition gives Total access to reserves and resources in excess of 500 million boe and a significant exploration potential across the 53,000 sq km area covered by the concessions.

Total has been present in Libya since 1954. In 2018, the Group's production in the country averaged 63,000 boe per day.

## Upstream investment

RYSTAD ENERGY IS forecasting that overall global upstream investments in 2020 will decrease by around four per cent, with investments in shale/tight oil expected to contract the most, by almost 12 per cent.

Rystad Energy believes that the lower oil price and weaker cash flows will force shale companies to reduce activity. Deepwater is the only segment expected to grow above five per cent next year, spelling a boom for the industry.

On a regional level, Africa, Russia and South America are expected to see growth or flat development in investments next year, with key players like Mozambique, Libya, and Mauritania pushing Africa's growth to the highest worldwide at 11 per cent.

Brazil, thanks to the Marlim and Mero projects, will likely push South America up to a predicted level of almost six per cent growth next year.

Investments in the Middle East and Australia are also expected to grow on the back of new LNG projects and the redevelopment of old oil fields, says Rystad.

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## APICORP makes recommendations for sustainable growth of MENA energy sector

THE ARAB PETROLEUM Investments Corporation (APICORP), has issued a white paper, titled *"The Energy Transition: Reshaping Investments and Strategies"*, outlining key recommendations for the sustainable growth of the energy sector in the MENA region in light of the transition towards a low-carbon world.

Based on the outcomes of a strategic roundtable that brought together 40 high-level industry experts from the energy and financial sector, including representatives of government, multilateral organisations and the private sector, the recommendations encompass sustaining energy investments; enhancing finance, improving regulations, pricing carbon, bolstering efficiency and re-educating the public on misconceptions surrounding the hydrocarbon industry.

Dr. Ahmed Ali Attiga, CEO of APICORP, said, "In this age of rapid evolution for the energy industry, greater stakeholder collaboration between leaders of the energy and finance markets is of critical importance. At the APICORP workshop on Energy Transition, the participants identified the need for countries to develop new regulatory models with higher standards of governance to create the right incentives and enable higher private sector participation. This involves outlining clear and specific national and local environmental concerns, setting targets and establishing independent authorities to oversee the implementation of the entire process."

"The actionable and achievable recommendations outlined in APICORP's white paper provide a roadmap that would help the industry that has long served as a cornerstone of the region's economies enter the next decade as a relevant and positive disruptor," Dr. Attiga noted.

Leila Benali, APICORP chief economist and head of Strategy, Energy Economics and Sustainability, said, "The transition towards a low-carbon world is perhaps the energy market's biggest shift in nearly a century. For the MENA region to keep pace and truly unlock the massive potential of its vast energy resources, countries need to act swiftly and engage the private sector to proactively adapt and innovate, especially in this period of increasing competition for attracting capital."



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An example from the Tegera Infinity range of safety gloves.

Image Credit : Ejendals

# Aiming for zero injuries to hands and feet

Swedish premium PPE company Ejendals welcomes new health and safety standards in the region.



**I**N DUBAI AND across the Middle East, safety standards are becoming increasingly regulated in order to protect the workers.

This is something welcomed by Swedish premium PPE company Ejendals, which is uniquely positioned to meet these strict regulations with its carefully designed and certified safety gloves and shoes.

“Investing in safer workplaces makes companies perform better and strengthens trust and confidence within the organisation. It’s a sign that you as a company put workers’ safety first. This is in our DNA and our presence in the region is also in response to the quickly growing demand for high-quality products. Being a nimble and an asset-light organisation, we are responsive to the market’s changing regulations and welcome collaboration with key customers,” says Amit Upadhye, regional sales director, Middle East and Africa, Ejendals.

## Core product

A key product in Ejendals’ Middle East venture is the Tegera Infinity range of safety gloves. A good safety glove should feel like a second skin and be as protective as plate armour. Ejendals is proud to offer safety gloves that satisfy workers’ demands on comfort and flexibility, while also providing unparalleled protection against fluids, heat and sharp materials thanks to its unique coating.

Ejendals’ products are always tested in very tough conditions so that they never

underperform in real situations where maximum protection is required. The Tegera Infinity glove is perfect for work in oil and gas, petrochemicals, manufacturing and mining.

“Each glove in the Tegera Infinity series has been engineered with a specific work environment or application in mind. That is how we achieve such a high level of protection without sacrificing comfort and dexterity for the user. The common denominator for all the Infinity series gloves is the excellent fit, which is something that our development team has worked hard to achieve,” continues Mr Upadhye.

Ejendals is a family-owned company based in Leksand, Sweden, which has produced premium quality PPE products for more than 70 years, spanning three generations of the family. The company has a vision of zero injuries to hands and feet. ■

“ Investing in safer workplaces makes companies perform better.”



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# STORM-WORK

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Image Credit : Adobe Stock

# Pushing the boundaries in offshore safety

Paul Onions, engineering manager at Reflex Marine, discusses the benefits of its work basket STORM-WORK, which has this year won the Safety Award from the Lifting Equipment Engineers Association (LEEA).

**Reflex Marine has been a member of LEEA (the Lifting Equipment Engineers Association) since 2014. After five years of being an active member of the organisation, what would you say are the main benefits of LEEA membership?**

Reflex Marine recognises LEEA as an excellent source of technical knowledge with vast expertise in the lifting area. LEEA members also participate in numerous other technical communities, which means we get regular updates about activities happening in related areas, as well as being made aware of safety issues arising.

Reflex Marine has always considered itself as an international company; we support projects in more than 70 countries throughout the world. Being involved with LEEA helps us

build credibility and confidence in the eyes of our customers. Finally, in relation to our product development, we take note of any suppliers that hold LEEA accreditation. The LEEA stamp provides a reassurance that they also have a focus on safe lifting practices and that they have passed a LEEA technical audit themselves. As such, it gives us confidence in

high quality and manufacturing standard of the products.

**Reflex Marine's work-basket design, STORM-WORK, won the LEEA Award this year in the Safety category. What is it about your design that distinguishes it from the competition?**

For any new product development we undertake, improving the safety of the offshore operations is our primary objective. We start by identifying the major risks in the current operations and then look to develop a design that mitigates them. In the case of STORM-WORK, we worked with Subsea 7 to identify the risks that they had in their operations at height with the use of a standard steel work basket. We also reviewed

“ The LEEA stamp provides a reassurance that they also have a focus on safe lifting practices.”



Image Credit : Reflex Marine



The STORM-WORK work basket.

Image Credit : Reflex Marine



The STORM-WORK work basket in action.

historic incident data from the past 30 years to identify any recurring common causes leading to injury or even fatalities as a direct result of work-basket design, pre-use checks or operational guidance. Out of this process, the key risks in work basket design for the offshore industry were identified as:

- Crushing & trapping
- Snagging
- Lateral impacts
- Immersion.

The driving force behind the design of the STORM-WORK was to address the traditional basket design shortcomings and protect passengers from these identified risks. We

introduced standoffs to create a safe working zone to lower the risk of trapping or crushing injuries to the workers inside the basket. The basket's roof was designed to protect against the likelihood of being struck by a falling object while still allowing good visibility throughout the lifting process. The unit profile has been contoured to deflect around objects rather than snagging on items whilst being moved. The lifting configuration has four anchor points stabilising the carrier and reducing the risk of tipping. The reduced mass in comparison to traditional work baskets means less momentum is carried into lateral impacts.

That feature, coupled with the buoyancy panels which provide impact absorption, reduces the impact effects on the passengers and it protects the surrounding assets, too. The buoyancy panels also ensure that in the event of immersion the basket will stay afloat in an upright position keeping the airways of the occupants above the waterline.

Further to that, STORM-WORK has undergone a rigorous testing and verification programme, in common with all of Reflex Marine's products. We incorporated the findings into the operational guidance for STORM-WORK to ensure the ease of inspection and maintenance and the highest standards of worker safety during work basket operations. It is that focus on safety and minimising the risks of the offshore operations incorporated into our unique design that really make STORM-WORK stand out compared to the other work baskets available on the market.

“STORM-WORK has undergone a rigorous testing and verification programme.”

### Is this the first time Reflex Marine has won for a LEEA Award?

This is the first time we have been nominated for a LEEA safety award (and won!), but it is not the first time we have been nominated for a safety award. To name just a few: in 2017 we received the Intercis Award or Best Offshore Solution for the complete portfolio of personnel transfer carriers. In the same year we were also granted the Health and Safety Award for the FROG-XT range of carriers at the Global Petroleum Show in Houston. Finally, for the WAVE-4 carrier – our first design for the transfer of standing passengers – we received the Seatrade Award in the category Safety at Sea. These and other awards we have received over the years are a result of a joint company effort and a reflection of the dedication of the whole team towards improving the safety of people working offshore. ■

*Paul Onions, engineering manager, Reflex Marine.*

Image Credit : Reflex Marine

# Health, safety & environment - moving ahead

More than 130 leading health and safety practitioners, government representatives, regulators and solution providers convened at the Habtoor Grand Resort, Autograph Collection Dubai for the Dubai Health, Safety & Environment Forum 2019.



Delegates at the Forum absorbed some insightful presentations.

Image Credit: Alain Charles Publishing

**T**HE FIFTH EDITION of the industry-leading event, which took place on 24-25 November, featured an array of high-level local and international speakers, and saw delegates absorbing some insightful presentations as well as participating in animated debates and panel discussions. The latest safety and protection solutions were showcased on the sidelines of the event, while lively networking sessions allowed plenty of opportunities to establish and strengthen business relationships.

## Critical role of leadership

The critical role of leadership was a strong theme at the event. Faaeza Al Katheeri, geoscience manager, Al Dhafra Petroleum, spoke about effective leadership in achieving 100 per cent HSE, highlighting interesting case studies of how HSE culture at organisations is a top down process, fostered by collaboration and open communication. She highlighted the need to obtain top management commitment; build a common understanding of culture; assess the existing culture and communicate assessment results; identify gaps, root causes and key initiatives to improve; and communicate the direction,

engaging team leaders and personnel.

In a similar vein, Salman Dawood Abdulla, executive vice president - HSSEQ, Emirates Global Aluminium, discussed how leadership and a motivated workforce can help enhance industrial safety, over and above equipment and safety management systems. He highlighted the critical role of leaders at all levels of an organisation in infusing a positive culture, and how this can enhance worker safety. Accountability of leadership is key, he said.

“Humans are the weakest link in the systems that protect us from process safety events.”

Dr Mohammed Aref, QHSE expert, Ministry of Human Resources & Emiratisation, explored the human factor deeper in his talk. “Humans are the weakest link in the sophisticated and complex systems that protect us from catastrophic process safety events,” he explained. “The next step change

in process safety is likely to come from a growing awareness of how to analyse human behaviour and design management systems to minimise its risk.”

He highlighted the need to consider the system in which the individual operates, including communications, man-machine interface, etc; develop management commitment; engage all staff to develop co-operation and commitment to improving safety; fight complacency; control the three ‘big monsters’ – frustration, stress and fatigue; and create sustainable behaviour change through sustainable interventions and promoting a motivating environment.

## Investing in safety

A key message was the significance of investing in employees. Many speakers highlighted the need to invest in employee safety and wellbeing as the road to a better business.

Joyveer Dutt, regional manager QHSE, Al Futtaim Engineering stressed the significance of understanding that gains should not only be in monetary terms, but also in what he explained as the ‘Triple p bottom line’ based on profit, people and planet. “Human capital is the key; no organisation can run without



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humans. Even in Industrial Revolution 4.0. It is absolutely necessary,” he told the audience. “If you want to enhance human capital you have to invest in them, invest in trust and invest in skills and training. Make them safe: invest in the best quality of equipment and welfare.” A poor safety culture results in low morale and productivity, hitting your bottom line, he added.

## Occupational health issues

Turning to occupational health, Dr. Mona Shawki, specialist of occupational medicine, Ministry of Health & Prevention, highlighted the global challenges to occupational health and safety – currently, more than 374 million people are injured or made ill every year through work-related accidents, the main causes of occupational mortality being circulatory diseases, work-related cancers, respiratory diseases and injuries. She outlined a strategy to provide occupational health in the workplace, including more work on anticipating new and emerging OSH risks; adopting a multidisciplinary approach; promoting a better public understanding of OSH issues, such as carcinogens in the workplace; expanding partnerships with government agencies; and strengthening international safety standards and national legislation.

Dr Maisoon Ali Alshaali, consultant, Public Health Medicine, Ministry of Health & Prevention stressed the need for long-term action and commitment to reduce pollution levels, involving changes in attitudes and lifestyle choices. She gave a presentation on the UAE’s National Health & Climate Change strategic framework which looks to assure the expansion of health surveillance and enhance data protocols related to climate factors.

“Oil and gas companies should include load safety standards in their codes of practice.”

Karim A. Pachyannakis, Corporate HSE & Quality manager, Al Mansoori Specialized Engineering, demonstrated how poor loading could lead to endangerment to life, legal repercussions, environmental damage, lost production, loss of company reputation and damaged equipment. Load safety training should be mandatory for all those security loads and transporting them, he said, and oil and gas companies should include load safety standards in their codes of practice.

Will Cadwaladr and Samantha Ellaby, associates, Clyde & Co, made a practical demonstration of the criminal investigation process, which may follow a workplace injury or fatality, exploring best practice and



Faeza Al Katheeri, geoscience manager, Al Dhafra Petroleum, addressing the gathering.

common pitfalls during the police and public prosecutor interviews. Beware of inadvertently admitting responsibility, steer clear of sharing hearsay, stick to facts and have a dedicated point of contact were amongst the pieces of advice they gave.

## Impact of digital transformation in the workplace

Leveraging digital technologies to promote workplace safety was an important theme. Daryl Wake, business development representative – Middle East at Universal Site Monitoring, an Australian manufacturer of location-sensing devices, outlined how harnessing the benefits of Industry 4.0 combined with the Internet of Things (IoT) can provide an enhanced level of worker safety.

“By combining hardware, Industry 4.0, IoT and some cloud computing we are now able to apply a similar level of rigour to our ‘human assets’ as we do to our equipment,” he said. “Better utilising this technology and having a smart alert and navigation system that collects and displays information via a variety of wireless communication methods, allowing data to be monitored, reported on, actioned and stored in a centralised location, provides us with a new level of keeping workers safe.... and alive.”

Dr. Sana Farid, co-president, VRAR Association MENA, commented on the evolution of training delivery methods. “Immersive technologies are widely applied across sectors,” she said. “We are moving towards e-learning; online learning, virtual reality and augmented reality. They are affordable and convenient and have much more impact compared to the traditional model,” she said. She pointed out that VR simulation training enables accelerated development of expertise in a risk-free

environment, bridging the gap between classroom training and real-life on-site experiences.

The forum also showcased the latest products and technologies in the sector. Ian Hume, sales director MEAIR, JLG Industries presented access solutions offered by his company to drive safety, pointing out that untrained operators accounted for a significant number of fatal accidents involving MEWPs and stressing the need for the ‘right person for the right job with the right equipment for the task’.

Cherian Varghese, founder & CEO, VIN Technology Systems, highlighted the benefits of collision avoidance systems, such as the elimination of blind spots and proximity warning. Daryl Wake, presented Universal Site Monitoring’s multi-featured safety monitoring devices, while Syed Farrukh Ali, senior territory manager, and Mohammed Jamad, key account manager at Ansell presented the company’s range of protection solutions.

## Enthusiastic reception

The conference had a very enthusiastic reception from delegates.

“The HSE Forum showcased a number of speakers and organisations highlighting the importance of strong, robust health and safety processes and cultures and how organisations and people need to be environmentally aware at all times. The event was a fantastic opportunity to engage with like-minded people and share our experience and knowledge and to build strong future relationships with the other attendees,” said one participant.

“There are a lot of new technologies and innovative ways to protect the workforce that I really wasn’t familiar with. The importance of technology and innovation is the main takeaway,” said another. ■



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# Envisioning global prosperity as a new era emerges

Under the patronage of His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al-Saud, Crown Prince, Deputy Prime Minister, and Minister of Defense of the Kingdom of Saudi Arabia, the highly-anticipated 12th edition of the flagship International Petroleum Technology Conference (IPTC) will be held 13-15 January 2020 at the Dhahran EXPO in Dhahran, Kingdom of Saudi Arabia, with Saudi Aramco serving as the Exclusive Host.

IPTC 2020 WILL be the first international multi-disciplinary, inter-society oil and gas conference and exhibition to take place in Saudi Arabia. This edition will see the industry's stakeholders gather together to discuss the new global energy vision and the collaboration needed to make it a reality.

Amin Nasser, President and CEO, Saudi Aramco, says, "Innovation and technology have long been key enablers of profitable growth in our industry. But to meet society's increasing demand for ultra-clean energy we need far greater collaboration across our industry (and with other industries) to enable a more sustainable, industry-led, technology-driven energy future. Innovation and technology can also inspire young hearts and minds to join us on a mission with profound meaning. That is why we are very honoured and excited to host IPTC 2020 under the patronage of HRH Prince Mohammed bin Salman bin Abdulaziz Al-Saud, Crown Prince, Deputy Prime Minister, and Minister of Defense, for the first time in the Kingdom of Saudi Arabia."

## World-class event

Mohammed Al Qahtani, IPTC 2020 Executive Committee Chair and Senior Vice President, Upstream, Saudi Aramco, says, "This is an historic moment for the industry. We must continue to focus on our traditional strengths of abundant resources, safe production, and reliable and affordable supply. But we must also bring the strength of the entire industry to bear on a new, clear, and compelling mission of meeting the world's growing demand for ultra-clean energy in the ongoing global energy transformations.

"With IPTC 2020 coming to Saudi Arabia for the first time ever, this is a timely opportunity to focus on the technologies, policies, and investments we will need to thrive in this new era. With the overall theme of 'Vision to Prosperity: A New Energy Emerges', the conference will address all



Image Credit : IPTC

*The exhibition will feature more than 150 exhibiting companies.*

these issues, with key decision-makers from government and industry, supported by more than 100 conference sessions, more than 700 technical papers, and one of the largest exhibitions with more than 150 exhibitors. This world-class event will attract more than 8,000 participants, and provide organisations with a platform to showcase the emerging technologies that will be central to our industry's contribution."

"Attendees can look forward to several keynote sessions, including a CEO plenary session and an Energy Think Tank Plenary Session, and a relentless focus on practical solutions to all these challenges. In particular, how together we in upstream can shape our ecosystem, how we can innovate and commercialise technology, and how we can

recruit, harness, and retain the skills of our talented people and deploy this worldwide talent to address the historic challenges and opportunities ahead."

According to Peter Coleman, CEO and Managing Director, Woodside Energy, "Our industry plays a crucial role in the new energy era, and IPTC provides an opportunity to share knowledge and insights that support this. Our experience investing in industrial scale technologies and supplying reliable energy to customers around the world is a good foundation to build on as we aim to reduce emissions while extending access to modern energy. Woodside is playing its part, preparing to develop the Scarborough and Browse natural gas resources to supply this growing demand."



Another important feature of IPTC 2020 is the Executive Plenary Session: 'Shaping the Upstream Ecosystem for a New Energy Era'. Jeff Miller, Chairman, President and CEO, Halliburton, who will speak at this session, notes that, "Technology that improves productivity will drive future returns and will be key as we look to 2020. Halliburton looks forward to participating in the International Petroleum Technology Conference – a premiere industry event where we have the opportunity to discuss the technology and innovation that leads our industry forward."

### Addressing the challenges

Several speakers from the Energy Think Tank Plenary Session share their thoughts on the challenges that the industry faces. Mark G. Papa, Chairman, Schlumberger, says, "One of the factors that needs to be considered as we look at the 2020-2025 global oil supply/demand picture is the likely slowdown in US shale oil YOY growth. This is caused by both increased capital discipline by producers and decreased growth capacity in two of the three main US shale oil fields."

"Among the most important challenges being faced by the petroleum industry is the need to address growing public concerns about emissions, especially carbon dioxide. The concept of the 'circular carbon economy' – closing the loop to reduce, reuse, recycle, and remove CO<sub>2</sub> from the atmosphere – encourages the use of all options to mitigate CO<sub>2</sub> emissions. This framework would deal effectively with climate goals while still allowing hydrocarbon fuels to be used for economic development," remarks Adam Sieminski, President, King Abdullah Petroleum Studies and Research Center (KAPSARC).

According to Bassam Fattouh, Director, Oxford Institute for Energy Studies, University of London, "Oil market dynamics are currently being shaped by two opposing forces. On the supply side, output disruptions at a historical record, slower US shale growth and high OPEC compliance have restricted supplies to the market. On the demand side, on the other hand, slower global economic growth and US-China trade tensions have adversely affected oil demand and market sentiment. In the medium to long term, prospects of global oil demand are becoming increasingly uncertain, while availability of finance could impact investment and supplies. How will all these factors play out and what are the implications for oil prices and producers' energy policies?"

### Maximising financial and human resources

On the subject of investment, Scott W. Tinker, Director, Bureau of Economic Geology, The University of Texas at Austin, observes, "Informed energy investment will benefit from the critical, global analysis of the complex interplay between energy, the economy and



Student presentations at a previous edition of the IPTC.

Image Credit : IPTC

the environment."

Neal Anderson, President and CEO, Wood Mackenzie, says, "We need the best minds to optimise energy markets for all our needs. At IPTC, I can't wait to discuss this not only with my esteemed colleagues on the panel, but with everyone participating. We need to make progress fast, to innovate imaginatively, and lead the change."

### A comprehensive programme

Apart from the plenary sessions, five panel sessions will highlight topics such as 'The Role of IR 4.0 in Revolutionising the Oil and Gas Industry', 'Emerging Technologies and Challenges from Exploration to Development', 'The Future of Gas: From Wellhead to Market', 'Talent Development and Workforce Diversity', and 'The Unconventional Business: Recycling the Know How'. The IPTC Society Presidents Panel Session will see presidents from the American Association of Petroleum Geologists (AAPG), the European Association of Geoscientists and Engineers (EAGE), the Society of Exploration Geophysicists (SEG), and the Society of Petroleum Engineers (SPE) discussing important developments and

issues in the respective societies.

Four seminars will focus on topics such as reservoir compartmentalisation, reserves and resources, geomechanics, and machine learning, offering attendees the opportunity to enhance their technical knowledge. The Diversity and Inclusion Panel Sessions and Workshop will include discussions on best practices to increase diversity, promote inclusion, and encourage the concept of belonging.

### IPTC 'Excellence in Project Integration' Award

The IPTC Excellence in Project Integration Award is given to a project that adds value to the industry and exemplifies strong teamwork, solid geoscience knowledge, reservoir and production engineering acumen, determined and watchful construction, and outstanding facilities engineering practices. The Award will be presented on the first day of the conference, and the three finalist projects will be presented in a special Showcase Session. ■

For information on how to register, please visit [go.iptcnet.org/regnow](http://go.iptcnet.org/regnow).

## About IPTC

FOUNDED IN 2005, the International Petroleum Technology Conference (IPTC) is the flagship multi-disciplinary technical event in the Eastern Hemisphere. The scope of the conference programme and associated industry activities address technology and relevant industry issues that challenge industry specialists and management around the world.

IPTC is sponsored by four industry organisations and societies, the American Association of Petroleum Geologists (AAPG); the European Association of Geoscientists and Engineers (EAGE); the Society of Exploration Geophysicists (SEG); and the Society of Petroleum Engineers (SPE).

IPTC is focused on the dissemination of new and current technology, best practices and multi-disciplinary activities designed to emphasise the importance of the value chain and maximising asset value. The knowledge, capabilities and strengths of the participating countries and the sponsoring societies global membership, over the spectrum of multi-disciplinary technologies, are central to the success of the conference and the accompanying exhibition.

Saudi Aramco's upstream carbon intensity stood at 10.2 kg CO<sub>2</sub>/boe in 2018.

# Sustainability in the spotlight

Saudi Arabia's state oil company is prioritising sustainability as it seeks to lure a new generation of investors. Martin Clark reports.

THE RELEASE OF the Saudi Aramco prospectus for an initial public offering (IPO) on Riyadh's Tadawul exchange is a landmark event in itself. The document, released in November, is an appeal to investors to take part in a debut listing mega deal.

Yet while the oil company's production credentials and profitability are not in doubt – it declared net income of US\$46.9 billion in its first half 2019 results – there remain question marks over its commitment to sustainability and the environment.

Aramco, the world's largest oil producer, pumps around 10 per cent of global supply. In an era of climate change, however, it casts a shadow over what would otherwise,

undoubtedly, be a no-brainer of a deal.

The IPO paperwork provides a few more insights into the group's sustainability strategy, now a priority alongside other business goals. With a positive sustainability spin on its vast oil production, it highlights the low carbon impact per barrel of output in comparison to upstream rivals.

"The company seeks to preserve the low carbon intensity of its crude oil production, which places it among the world's least carbon intense sources of crude oil," the IPO document reads. Aramco's 2018 upstream carbon intensity figure stood at 10.2 kg of CO<sub>2</sub> equivalent per barrel of oil equivalent.

## Yanbu refinery

Sustainability has become a vital issue for Aramco and other oil producers in recent times, amid heightened environmental scrutiny not just from activists but also investors.

With the IPO, Aramco is for the first time in the spotlight in the eyes of the world's big banks and institutional investment houses. But, like other oil companies the world over, it

has long been integrating this dimension into its business activities.

On 13 November, Aramco announced that it had been awarded the King Khalid Award 2019 for Corporate Sustainability, with its Yanbu refinery singled out for special praise. Collecting the award from King Salman, Aramco president and chief executive Amin Nasser called the company "an international leader" in the industry within the field of corporate sustainability. He also flagged the Yanbu example, a refinery with a production capacity of 250,000 barrels per day (bpd) of crude oil.

## Saudi Aramco – intensity and flaring

**Gas flaring:** <1 per cent (H1 2019)

**Methane intensity:** 0.06 per cent (per ton of marketing sales gas)

**Upstream carbon intensity:** 10.2kg CO<sub>2</sub>/boe (2018)

“Sustainability has become a key issue for Aramco and other oil producers in recent times.”





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“It is considered an exemplar of Saudi Aramco’s facilities that implement sustainability in their core operations through the use of low-carbon energy solutions, following regulations and standards in operations, maintenance, and innovation fields,” he said.

This, he added, is in addition to raising employees’ awareness on the importance of a commitment to environmental standards, and successfully implementing social, economic, and environmental initiatives such as the use of advanced technology toward creating a clean energy industry.

Nasser also highlighted Yanbu’s restoration of natural habitats, which are essential for marine organisms and birds, through the planting of a mangrove forest, considered to be the most important natural basin for the absorption of carbon dioxide.

## Carbon economy

It is a broad theme that has become more prevalent, not just at Aramco, but across the energy industry and the wider world.

Aramco’s chief technology officer, Ahmad O. Al-Khowaiter, discussed the notion of the ‘circular carbon economy’ at a trade event in India. He defined this as moving from a linear model, where materials are used and then disposed of, to a more circular model through the reduction of consumption, re-use, and recycling.

This means that CO<sub>2</sub> emissions from hydrocarbon combustion should be captured, re-used, and recycled in other forms of energy to close the carbon cycle efficiently, as well as leveraging non-carbon renewables. He said the goal is to achieve a balance between the carbon emitted and the amount reduced, recycled, and removed.

“This carbon balance is the natural order of things,” he said. “So, taking our economies and making them aligned with nature just means restoring the carbon balance. That is what the Earth has been

## Zero gas flaring by 2030

On 6 November, Saudi Aramco announced that it is joining the World Bank’s ‘Zero Routine Flaring by 2030’ initiative.

The group’s flaring accounted for less than one per cent of its total raw gas production during the first half of 2019.

“We have been taking active steps to reduce flaring in our operations for the past 40 years,” said Ahmad A. Al-Saadi, Aramco’s senior vice-president, technical services.

The World Bank initiative was launched in April 2015 and brings together governments, oil and gas companies, and development institutions from around the world. The Saudi government joined in December 2018.



Image Credit: Adobe Stock

**Saudi Aramco is committed to eliminating flaring by 2030.**

doing for billions of years, and we need to be able to emulate that.”

Aramco has already undertaken a number of initiatives to move toward the circular economy, he added, via reducing, recycling, and removing CO<sub>2</sub>. That includes cutting carbon emissions from its operations, with an annual reduction of gas flaring since the 1980s, and committing to eliminate it completely by 2030.

## Other initiatives

It is not hard to find other examples. At its Uthmaniyah field, Aramco is sequestering 800,000 tons of CO<sub>2</sub> per year to enhance oil recovery. It is also examining different options for sequestering carbon, including directly removing CO<sub>2</sub> from the air at an industrial scale.

Cleaner fuels are another key feature of the group’s downstream investment drive — it is already the fourth largest refiner in the world. The Ras Tanura refinery clean fuels project, for

instance, will supply products that comply with Euro-V fuels quality standards.

Beyond pure operations, Aramco is active on a host of other fronts, such as collaborating with automotive engine manufacturers to maximise efficiency to reduce emissions from the use of fossil fuels. Additionally, the company is working with partners to develop carbon capture and storage technologies for cars and trucks, and enabling the unloading of the CO<sub>2</sub> at fuel stations for recycling into another energy form. The latest development in this programme is the successful testing of technology for heavy-duty trucks and achieving the capturing and storing capability of 45 per cent of the CO<sub>2</sub> emitted from the engine exhaust.

## High priority

While Aramco might deny it is stepping up its sustainability efforts in the face of increased scrutiny by investors, there is no doubt the IPO move is propelling the group further into the spotlight. This pushes environmental objectives high up the agenda.

“Building on our position amongst the world’s least carbon intense sources of crude oil, Saudi Aramco aims to grow its business sustainability by leveraging technology and innovation to lower our climate impact,” said Nasser in the IPO notes.

“We deploy technology, with the aim of producing oil and gas ever more efficiently, reliably and sustainably.”

“ Saudi Aramco aims to grow its business sustainability by leveraging technology and innovation to lower our climate impact.”

With an average daily crude oil production of 10 million bpd, and a new public profile to manage, Aramco will need to continue on the same path for a long time to come. That said, investors know a good deal when they see one, and the opportunity to tap into the kingdom’s oil riches resulted in the institutional tranche of the IPO being almost three times oversubscribed. The IPO raised US\$25.6bn, giving the company a value of US\$1.7 trillion. In the face of climate change, and even a ‘climate emergency’, money still talks in the oil and gas world. Ultimately, gaining a slice of Saudi Arabia’s 227 billion barrels of proved liquid reserves — five times larger than the combined proved liquid reserves of the five super-majors — are an opportunity too good to turn down. ■



## Saudi Aramco showcases 4IR technologies at ADIPEC

AT ADIPEC, SAUDI ARAMCO demonstrated how it is leveraging Fourth Industrial Revolution technologies, with one of the main pillars being UAVs and robotics.

“We have ground robots to operate in remote area unmanned facilities, and to extinguish fires in emergencies, and we have industrial submarines to inspect our subsea assets and our tanks,” said a representative on the Saudi Aramco stand. “We also have drones for emergency response, for inspection services for example to inspect flare stacks, using thermal imaging, and for environment protection to detect gas leaks. There are so many applications.”

On display was a small drone specifically designed to be deployed from any manhole inside a structure. “One of the challenges is to eliminate confined space injuries in our plants,” said the representative. “Large drones cannot go inside structures, but this small drone is able to help us conduct inspections for vessels and tanks.” This thereby eliminates the need for a human to enter the confined space.

Saudi Aramco is developing and evaluating many new technologies, he said, with a focus



The voice-activated digital helmet.

on autonomous robotics. “We are trying as much as possible to get some autonomy in these robotics solutions. Currently they are being controlled by an experienced pilot, but in the future we want to push a button and the drone will be so smart that it can go and do the job that is required.”

Also on display on the Saudi Aramco stand was a voice-activated digital helmet which enables operators and engineers to have access to data while they are working in the field.

“So if they go to a pipe, for example, it is connected to our cloud database so they can see parameters such as pressure, temperature and many others,” explained the representative. “They can also see specifications and histories of materials, for example the last maintenance or inspection took place and when the next inspection is due. They have access to industry and company standards. They also can use on-demand consultation and connect with our central engineering, where consultants can see what the operator or engineer is seeing and give them guidance on what to do.”

“So it is helping to make the business faster and more efficient, because normally you would see a problem, go back to the office and have to figure out all these procedures, which can take some time. Sometimes it can take days to reach the experts required.”

“This has just passed our proof of concept requirements and is now in the deployment phase,” he said. Since the device requires industrial wifi for the full benefits to be realised, Saudi Aramco is adjusting its infrastructure accordingly, he added.

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# Buoyant mood at ADIPEC 2019

The pre-eminent gathering of the global oil and gas industry was marked by record attendance and a host of new technology launches.

**P**ROVISIONAL FIGURES SHOW attendance at ADIPEC 2019 grew by seven per cent to 155,000, and the number of participating national and international oil companies grew 21 per cent, with more than 100 government ministers and industry CEOs taking part in the conference sessions.

This year's event saw the strategic conference programme is being restructured as 'Oil and Gas 4.0', referencing the 'Fourth Industrial Revolution' and highlighting the impact of digitalisation and emerging technologies on the sector. Headline speakers at 'Oil and Gas 4.0' included Condoleezza Rice, the former United States Secretary of State; General (Ret.) David Petraeus, Chairman of the KKR Global Institute; and Sebastian Thrun, CEO of KittyHawk and Founder of the Google X Lab.

The opening ceremony set the scene for the four-day event. In his keynote address, H.E. Dr Sultan Ahmed Al Jaber, UAE Minister of State and Group CEO of ADNOC, called on the oil and gas industry to modernise in response to disruptions on multiple levels and a fast-evolving energy landscape.

Dr Al Jaber said the oil and gas industry is being disrupted by new technologies, new business models, new forms of energy and a new geopolitical order, with the rise of Asia.

"This era of disruption is just the beginning and will only gather pace over time. Yet, the oil and gas company of today can be a winner tomorrow, if it operates at a lower level of cost and a higher level of performance; if it brings digital into the core of its operations; if it embeds sustainability into its DNA; and if it rethinks how to leverage its partnerships, enable its people and re-centre its customer relationships.

"This is the mission we defined together last year as Oil and Gas 4.0," Dr Al Jaber said. "By doubling down on this mission-to-modernise, the industry will remain an essential pillar of the future diversified energy mix."

He noted that even in the most fast-paced transition scenarios, oil and gas will still provide the source for over half of energy



H.E. Dr Sultan Ahmed Al Jaber, Minister of State and Group CEO of ADNOC, giving the keynote address.

Image Credit : ADNOC

demand in 2040.

"These facts are undisputed and make a compelling business case to invest in the future of our industry."

As the oil and gas industry embraces an age of disruption, digitalisation is the next frontier to driving efficiencies, curbing costs and extracting the highest value from every molecule of hydrocarbon produced, Dr Al Jaber said.

“ This era of disruption is just the beginning and will only gather pace over time.”

"At ADNOC, Artificial Intelligence powers our Panorama Digital Command Centre, enabling clearer, real-time, business-critical decision making. Advanced robotics are transforming our surface and subsurface operations. And predictive analytics is significantly minimising our operational

downtime and maximising our savings."

Dr. Al Jaber stressed technology is key to unlocking one of the central challenges facing the oil and gas industry: how to deliver more energy with fewer emissions.

"We are constantly innovating to remain among the least carbon-intensive producers in the world. We are expanding the Middle East's first commercial-scale carbon capture utilisation and storage facility to capture at least 4.3 million tonnes of CO<sub>2</sub> annually by 2030. That equals the amount of CO<sub>2</sub> captured. As we expand our operations, we are pioneering the use of optical drones to monitor fugitive emissions, helping us maintain our best-in-class methane intensity. These innovations will help us keep our longstanding commitment to protecting the environment."

## Strategic announcements

Over the four-day event, ADNOC made a series of strategic announcements to progress its ambition to maximise value from its assets and resources in response to the fast-evolving energy landscape.

In the opening address, Dr. Al Jaber announced ADNOC will join major international oil companies (IOCs) as founding





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partners of the ICE Futures Abu Dhabi (IFAD) – the new exchange that will host the world's first Murban crude oil futures contracts. ADNOC also announced details of other initiatives it is pursuing to become a more proactive and adaptive marketer and trader, in the areas of shipping, storage, and trading.

ADNOC took further strides to embed innovation and cutting-edge technology across its entire value chain, signing an agreement with Group 42 (G42) – an Abu Dhabi based artificial intelligence (AI), cloud and supercomputing company – to establish a joint venture to develop and commercialise market-leading AI products for the oil and gas industry.

The NOC also announced its partnership with Total to deploy drones and unmanned vehicles to collect 3D seismic data as it expands its search for new oil and gas resources throughout the emirate of Abu Dhabi. The pilot project using Total's Multiphysics Exploration Technologies Integrated System (METIS) – the world's first automated seismic acquisition system – will see thousands of sensors deployed by air using a fleet of drones and later retrieved by unmanned ground vehicles.

In its upstream business, ADNOC announced a AED 1.8bn (US\$489mn) investment to upgrade its giant Bab onshore field, which will sustain long-term crude oil production capacity of the field at 485,000 barrels per day (bpd) and support ADNOC's target to achieve oil production capacity of four million bpd by the end of 2020 and five million bpd by 2030.

ADNOC Drilling, a subsidiary of ADNOC, announced a major rig fleet expansion programme, whereby it will acquire dozens of onshore and offshore rigs by 2025, while ADNOC LNG, a subsidiary of ADNOC, concluded supply agreements with subsidiaries of BP and TOTAL.

"We will build on the momentum we have created during ADIPEC and confidently move forward to deliver even greater levels of performance in the coming months," said H.E. Dr Al Jaber.

The importance of In-Country Value (ICV) was highlighted throughout the show, with many companies present highlighting their commitment to localisation and expanding their local presence.

Schlumberger signed a memorandum of understanding with the Abu Dhabi National Oil Company (ADNOC) to support its In-Country Value (ICV) Program, whereby it will recruit and invest in the training of UAE nationals for the company's oil and gas services business with the potential of up to 1,000 new job hires,

Microsoft announced that it will open an AI Centre of Excellence for Energy in the UAE – a global first for the company – to empower organisations in accelerating digital transformation and equipping the workforce



*The crowded exhibition floor at ADIPEC 2019.*

Image Credit : DMG Events

with AI skills, as well as collaborating on coalitions to address sustainability and safety challenges.

## New product launches

As in previous years, ADIPEC served to provide a platform for launching and showcasing innovative new products. Weatherford launched ForeSite Flow, a full-range, non-nuclear multiphase flowmeter paired with Weatherford ForeSite intelligence, while Halliburton introduced its PixStar High-Resolution Ultrasonic Imaging Service, a new logging-while-drilling technology that provides real-time images of the borehole to help operators identify fractures, improve wellbore stability and optimise completion design.

Restata showcased its flagship personnel safety and security tool, the Reestrata Platform, which provides real-time tracking of people and assets anywhere in the world, while IEC Telecom Group displayed its latest solution OneGate Energy, which keeps remote units connected, providing high-quality data for daily operations and staff welfare.

Schneider Electric showcased how advanced, digital technologies such as its IoT-enabled EcoStruxure platform, help oil and gas companies reduce project risks and costs while reaching the first production sooner.

Eaton launched its integrated remote monitoring hazardous area LED lighting solution for hazardous area, the Champ VMV LED Connected Lighting, which optimises industrial applications based on space and specific usage requirements. The fixtures also come with the latest communications and sensing technology,

Well-SENSE launched its latest fiberline intervention (FLI) development, Active FLI which builds on the capability of Well-SENSE's novel fibre optic downhole data acquisition system

with the addition of a range of discrete measurement devices.

TARGET announced the official release of its MEERA simulation package, which combines AI and numerical simulation models in one framework, making it the first AI-Physics augmented reservoir simulator. While Norwegian WINS introduced its WIMO live wireless retrofit well monitoring system, which provides access to live downhole data.

The mood of exhibitors was positive, with many expressing confidence about growth prospects and looking to expand their business in the region.

"We've seen significant increases in Saudi Arabia, Iraq, Kuwait and Abu Dhabi. The overall trend is optimistic and we've seen double-digit growth in all of those countries for our key business, Artificial Lift, as well as strong interest in our production facilities business," remarked Mohammed Doghmi, president, Alkhorayef.

"ADIPEC is becoming the biggest oil and gas show in the world, and we have to be here to meet our clients and suppliers. This forum gives us a good opportunity to see all of them at the same time," he added, a comment echoed by many other exhibitors.

"The dramatic changes we see not just in oil and gas operations, but across business and economics as a whole, mean ADIPEC is more important than ever as a global meeting point for the industry's leading thinkers and decision makers," said Christopher Hudson, president – dmg events, which organises ADIPEC.

"Year-by-year, ADIPEC has evolved to reach record numbers of attendees, exhibitors, and conference delegates. Exhibitors can source new business, thought leaders can exchange knowledge, and firms can develop the next generation of talent. Through ADIPEC, Abu Dhabi is unlocking new value in oil and gas." ■



The logo for Evolution, featuring the word "evolution" in a lowercase, sans-serif font. The "e" is red, and the rest of the letters are black. A black swoosh underline starts under the "e" and loops around the "n".

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## Digital disruption driving the energy sector

AT A TIME of change across the oil and gas industry, ADIPEC 2019's focus on the impact of technology and how the industry adapts to maximise opportunities and create synergies, provided a forum for the exchange of views and insights about digital transformation across the sector.

At a Global Business Leaders session entitled 'How is the industry embracing digital innovation?' experts focused on how the industry is working to achieve the best from digital innovation, continuing the debate on the nexus between technology and energy as well as the gap between reality and perceptions.

Musabbeh Al Kaabi, Petroleum and Petrochemicals CEO, Mubadala Investment company, was of the opinion that in the oil and gas and energy portfolio, technology innovation is going to disrupt across sectors.

"Technology will help portray the oil and gas sector in the right way," he said, adding that it will play a significant role in minimising emissions.

David Dickson, president and CEO, Mc Dermott, drew attention towards the need to make the energy sector attractive to young people, while emphasising the continuing need for improving efficiency and minimising risks to customers.

"Across the globe, the challenge is in attracting talent to the industry," he reiterated.

Dr Muhammad Al Sagaf, Saudi Aramco, highlighted the region's efforts in adopting technology in the sector. "If we want to survive, we have to embrace it. The companies that make investments in strategy are the ones that will survive," he said.

Throwing light on the symbiotic relationship between technology and

energy companies in the Middle East, Al Sagaf stressed that the emerging role of the latter is to have a complete understanding about the technology they need.

"At Saudi Aramco, we had to understand everything about it and how it operates etc, while working in conjunction with a technology partner," he explained. He went on to add that considering that the technology space is evolving, it is important for organisations to keep updated about potential trends, and take advantage of the numerous opportunities for preventive maintenance. He quoted the example of Hub71 in Abu Dhabi, a global tech ecosystem which acts as a catalyst for startups to succeed.

Adding to the discussion on the impact of technology on promoting safety, Al Kaabi touched upon how it would aid in issues related to human behaviour and avoiding human errors.

Dismissing the growing fears about AI and other technological advancements affecting job opportunities for people, Al Sagaf remarked that AI will enable humans to utilise their talents to the highest level, making humans more relevant and ensuring that the menial, repetitive tasks are taken care of by machines.

"Combining features including facial recognition and emotional interpretation, among others, helps in prediction and investigation and will lead to more reliability in the oil and gas sector," he added.

As the 4.0 revolution advances at unprecedented speed, there is little doubt that it presents opportunities to find solutions to various challenges in the global energy transition and contribute towards minimising environmental risks.

## Inclusion and diversity can deliver business benefits for Oil & Gas Industry

OIL AND GAS companies will reap financial as well social benefits from actively promoting inclusion and diversity in their organisations, industry leaders at the ADIPEC conference heard.

Delivering the keynote address for ADIPEC's co-located Inclusion and Diversity in Energy Conference, Tala Al Ramahi, chief strategy officer for the Special Olympics World Games Abu Dhabi, said that while diversity remained an issue in oil and gas, ADNOC and other leading companies were actively seeking to change this.

"Women make up only 15 per cent of the oil and gas industry, a number that drops further among the higher-paid technical roles," said Al Ramahi. "The energy sector remains one of the least gender-diverse sectors in the economy, despite recent efforts to encourage and promote women's participation.

"It is now time to understand why we fall short within various indicators of diversity and find remedies to correct them."

Among the current positive developments, Al Ramahi noted that 22 major international and national oil companies had this year issued a call to action to close the gender gap in the industry. She also highlighted ADNOC's programmes to increase the diversity of its workforce, having been named winner of the 'Oil and Gas Inclusion and Diversity Company of the Year' at this year's ADIPEC Awards.

In his opening address for ADIPEC, His Excellency Dr. Sultan Ahmed Al Jaber, UAE Minister of State and Group CEO of ADNOC, re-stated ADNOC's ambition to provide an innovative, diverse workplace, where women work alongside men in the field and in leadership roles.

"At ADNOC Group, His Excellency Dr. Sultan Al Jaber has committed to appointing at least one female CO (chief officer) across his group of operating companies. Already 15 per cent of senior managers are women, and they are increasing the number of female recruits," said Al Ramahi.

She also praised ADNOC for committing to recruit more people of determination into the organisation.

"Diversity matters, and inclusion pays off when an organisation commits to being as diverse as they can be for everyone. Regardless of ability or disability, gender, or educational background, race or ethnicity, or cultural background. And again, this is not just about improving a company's reputation. Study after study on this topic has repeated that this commitment to inclusion provides organisations with a serious competitive advantage."



Tala Al Ramahi giving the keynote address at the ADIPEC Inclusion and Diversity in Energy conference.

Image Credit : DMG Events



## Precision for the future in flow measurement

WEATHERFORD UNVEILED FORESITE Flow, a pioneering flow measurement solution driven by Production 4.0 intelligence, at ADIPEC 2019. The multiphase breakthrough from Weatherford delivers full-range flow insight for individual or group wells in real-time and without a nuclear source.

ForeSite Flow is a full-range, non-nuclear flowmeter combined with Weatherford ForeSite intelligence. Built for every production environment from heavy oil to wet gas, this technology aids in precise flow measurements for any fluid mixtures without separation.

By removing bulky test separators from the well site and eliminating nuclear-source management typically associated with other inline multiphase flow meters, ForeSite Flow reduces both capital and operating expenses while increasing well-test frequency and accuracy.

"ForeSite Flow is all about driving results for the organisation. It fits in very well with the objectives of managing businesses efficiently while reducing costs," Benoit Pinson, global product line director, testing services at Weatherford commented.

"ForeSite Flow significantly increases



Image Credit: Weatherford

*ForeSite Flow delivers full-range, non-nuclear flow insight for individual or group wells in real time.*

efficiency through greater control, making it possible to gain access from the desk," he said, referring to the convenience of viewing flow data remotely through intuitive dashboards displaying real-time production rates and fluid properties to reveal true reservoir behavior.

Pinson added that the launch of ForeSite Flow has received a "great reception" in the Middle East, since it aligns well with the region's adoption of the latest technologies and also meets sustainability objectives, due to reducing HSE risks and eliminating nuclear-source management typically associated with the other inline multiphase flowmeters.

Production 4.0 capabilities help drive greater productivity while slashing costs and enhancing safety benefits for the users. Weatherford estimates that ForeSite Flow aids in 70 per cent less OPEX spend as compared to conventional separators and 40 per cent less CAPEX. Further, it offers the benefits of reduced maintenance, lowers inventory requirements and requires a smaller footprint.

Superior measurement accuracy is unaffected by fluid chemistry, salinity, or impurities and is compatible with any flow regime. The technology delivers continuous, real-time data and is calibrated to provide sub-second resolution for improved reservoir and production management decisions.

"The ability of the technology to gain control remotely and anticipate errors helps in preventive action," Pinson pointed out.



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## Promoting efficient operations with innovative drilling solutions

DOWNHOLE DRILLING SOLUTIONS specialist Churchill Drilling Tools continues to expand in the Middle East – and its success has been underpinned by recent successful applications of its innovative HyPR HoleSaver™ technology in the region. Speaking to *Oil Review Middle East* at ADIPEC, Churchill's general manager for its business in the Middle East and Asia, Nicholas Kjaer, said, "Since entering this market four years ago, we have expanded our operational base in Abu Dhabi and developed a significant footprint throughout the GCC as clients see the benefits of our innovative technology – making their operations safer, faster and more cost efficient."

Earlier this year, the company had a "major breakthrough" with its HyPR HoleSaver technology, the world's first hydraulic pipe recovery system, which enables operators to sever their drilling string in just a few hours and recover quickly and safely from stuck pipe incidents. Unlike traditional stuck pipe methods, it requires no additional topside equipment or personnel.

"Many companies enter the market with new technology. However, it's not about being first, it's about having an application which meets the needs of the operator," stressed Kjaer. "That is why the HyPR has taken off. Stuck pipe usually halts drilling operations until the pipe can be freed – adding millions of dollars to the cost of a drilling campaign. This simple but innovative technology provides a safe, quick and cost-effective method of freeing stuck pipe."

"We've had four successful HyPR cuts in around four months with different operators in the Middle East, cementing this technology in the region. It further demonstrates that our operators are at the forefront of new technology and willing to push the boundaries of innovation to improve operations," he continued.

"Word is spreading fast, and we're already seeing a huge demand for this technology. Pre-placed in the string, operators recognise that activating the HyPR to recover from stuck pipe can save days, if not weeks of delays mobilising specialist personnel or high energy equipment."

At ADIPEC, the company displayed one of these HyPR cuts. It was a record-breaking sever, completed in just 60 minutes by a UAE-based operator.

Kjaer added that the company prides itself on being operators' most valued partners for downhole circulation, and makes its expertise and support readily available. It continues to break records with its DAV MX™ CircSub downhole circulation tool, which has celebrated more than 2,300 runs worldwide.

And there is no let-up in innovation and the development of new technology. "We always have new technology on the drawing board," said Kjaer, explaining that as a flexible, adaptive and innovation-focused organisation it is often approached to find solutions to specific client challenges.

"Our products are state of the art and manufactured with the best possible materials," he stressed. "This makes it suitable for demanding applications including sour gas. Indeed, with the increased focus of operators on gas, Churchill's technologies are increasingly catering to this market."

Turning to its market plans Kjaer commented, "The UAE remains our first and main hub for the Middle East and Asia, and we see continuing growth potential for us here for years to come. We are hiring more people, expanding our local manufacturing footprint and growing our operations base."

While it has a significant footprint in the GCC and indeed globally, Churchill is selective about the markets it enters. "The demand for our technology is there. Our concern is that when we do enter a certain market, we are able to give the right support to our clients. Available 24/7, we aim to become an extension of the drilling team – we really do partner with our clients. We won't enter a market unless we know we have the right resources to partner our clients 100 per cent. Combined with the effectiveness of our tools, our partnership approach explains why we're successful, why our clients keep coming back to us and why we continue to grow. We won't compromise on the service quality we provide our clients."

While the localisation requirement has a big impact, it ties in with Churchill's strategic focus. "Strategically, we tend to do business with a set-up that involves a significant local contribution. We manufacture locally and partner with many local organisations, thereby ensuring we play our part in contributing to the overall local economy."

Kjaer is optimistic about future prospects. "If you have a combination of innovative technology that brings added value to the client, an experienced and highly skilled support team available 24/7, a commitment to partner with clients to understand their challenges and come up with solutions to become more efficient, then almost anyone will listen and talk to you about doing business. That has been the case for Churchill since we established in the Middle East four years ago, and I see that continuing."



Nicholas Kjaer with the Churchill Drilling Tools team at ADIPEC.

Image Credit : Churchill Drilling Tools

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## Reinforcing partnerships

THE ITALIAN TRADE Agency (ITA) hosted 32 SMEs on the Italian Pavilion at ADIPEC. Speaking exclusively to *Oil Review Middle East*, His Excellency Nicola Lener, the Ambassador of Italy to the UAE, said, “Italians welcome the partnership with the region and we look forward to strong, durable relationships in diverse areas of business. Italian companies can offer their unique expertise in sustainable services, engineering as well as consulting services and customised solutions for the oil and gas industry.

“The leadership and foresight of the UAE government is an important factor in the economic partnership. Technology constitutes a large chunk of our exports to the UAE. Italy is looking at strengthening ties with the UAE in areas including mechanics, logistics, the food industry, health services and technology.”

Discussing the ITA’s primary areas of focus, Amedeo Scarpa, Italian Trade Commissioner to the UAE, Oman and Pakistan, commented, “We are looking at diversification in the region, which is challenging, but it is a part of the game. Our strengths in customisation and offering tailor-made solutions, in combination with technical expertise, are helping to adapt to region-specific requirements. Italian companies are increasingly focusing on a combination of sustainability with efficiency.

“The 32 SMES hosted by the ITA showcase a wide range of specialities and sustainable products to improve efficiency across the oil and gas industry. The companies participated in the exhibition thanks to the support of the Italian Trade Agency, and are highly specialised in producing technologically advanced devices and machinery.

“The ITA has been participating at the conference since the first edition,



Image Credit : Italian Trade Agency

*Amedeo Scarpa, Italian Trade Commissioner to the UAE, Oman and Pakistan and His Excellency Nicola Lener, Ambassador of Italy to the UAE.*

35 years ago and we are looking at increasing the number of exhibitors. We have been contributing towards the efficiency across the oil and gas value chain.”

Turning to the ITA’s future plans, Scarpa said, “Expo 2020 would be a great opportunity to showcase the creativity and technology of Italy. The slogan of Italy for the Expo is ‘Beauty connects people.’ The ITA will continue to emphasise Italy’s efforts to make life better through beauty and efficiency.”



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# Fostering passion for an oil & gas career

Peter Haugaard, head of People, Performance and Culture, KPMG Lower Gulf, discusses how to convince millennials that oil and gas is an industry offering promising career opportunities.

*Millennials expect their employers' technology to be on a par with what they use in their personal lives.*

RESEARCH INDICATES THAT more recent generations may view oil and gas as an industry in decline rather than an innovative sector in which to build a future, and that it is more detrimental to the environment and society than beneficial. When you ask millennials to identify their preferred career path, they often name employers in technology, public service, and corporate social responsibility. Oil and gas does not always make their list, because they do not think it matches their values.

## Millennial values differ

Generally, millennials prize purpose and meaning in their careers. For instance, they often prefer to join and stay with companies that clearly articulate their principles, according to Gallup research. It also indicates that millennials seek career mobility, with 87 per cent saying that professional development or career growth opportunities are very important to them.

The Gallup findings also suggest they are willing to change companies to gain that experience. Yet at the same time, millennials also tend to seek more of a work-life balance than previous generations, and their careers are not necessarily the most important part of their lives. When they are at the office, they typically prefer collaborative effort to solitary work, and value inclusion and diversity.

Finally—and a key point for oil and gas companies to remember—this generation grew up with ubiquitous technology, and they want their employers' enterprise technology to

be up to date and on par with what they use in their personal lives. A remarkable 93 per cent say that a business having the latest technology is an important value proposition when choosing a workplace, and 42 per cent of them say they would leave if the technological infrastructure was substandard.

## Focus on learning and innovation

Millennials are frequently looking for employers who will expose them to Industry 4.0 (i4.0), but they may not realise that their opportunity to work with new technologies does not have to be at a traditionally defined "technology" firm. The i4.0 technologies that oil and gas companies have implemented over the last decade, under economic and regulatory pressure to continually make operations safer and more efficient, are in line with what many millennials want exposure to. Examples include automated production, remote asset monitoring through Internet of Things sensors, and data analytics to crunch vast amounts of valuable information. ExxonMobil and the Massachusetts Institute of Technology's effort to leverage artificial intelligence to detect

natural seep in deep ocean waters is the kind of project millennials can get excited about. Meanwhile, BP's upstream chief operating officer for production, transformation and carbon recently said that millennial employees are demanding the company's teams work in a more agile way to complement the increasing deployment of these digital tools.

Forty-six per cent of millennials intending to stay at their current organisations for at least another five years say they receive help understanding and preparing for i4.0. Yet among those intending to leave within two years, that figure dropped to 23 per cent.

## Vaulting ambition

Some employers labour under the misapprehension that millennials have no loyalty. Yet, while they are more willing to move for the right opportunity, their job tenure is no shorter than that of Generation X. Research suggests that millennials set themselves similar career goals as those of prior generations. They nurture a desire to make a positive impact on their organisations, like baby boomers. They would also like to work with diverse groups of people, like Gen X.

## Attracting talent

The oil and gas sector would do well to consider tailoring its employee value proposition to match millennial values. High compensation alone may not attract this cohort, identified as one of the most charitable generations in history. The millennial

“Millennial employees are demanding that the company's teams work in a more agile way.”



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focus on altruism offers organisations a unique opportunity to refocus their employer brand so it articulates a social mission that differentiates themselves from competitors.

Some oil and gas organisations may need to redefine their core competencies, which in turn can update and create new career paths. By redesigning and communicating new career progression opportunities, companies can reinforce their commitment to the current workforce to better engage and retain talent, while attracting employees with the skills needed in the future. New technology – automation in particular – creates opportunities to attract innovation and career-focused employees as organisations shift their employee base



*Oil and gas companies could consider sponsoring events such as hackathons.*

Image Credit: Open Data Hackathon / Flickr


“Oil and gas companies would do well to consider developing relationships with local universities.”

toward higher-value work like strategy and analytics, and away from repetitive, manual tasks.

Not only does this allow oil and gas organisations to remain relevant in the marketplace, but the availability of more strategic and advisory roles can lead to higher job satisfaction and improved retention.

Finally, to create a pipeline of fresh talent, oil and gas companies may do well to

consider developing relationships with local universities, offering internship and externship programmes as well as sponsoring events like ‘hackathons’ and design sprints. Industry leaders can help combat misperceptions by sharing stories from current employees that demonstrate a positive experience. In particular, potential employers may choose to highlight that oil and gas offers some of the most innovative and rewarding career opportunities of any international industry. ■




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# Powering oil and gas with the 3DEXPERIENCE

While the Dassault name is well known in the Middle East through its association with aviation and military jets, Dassault Systèmes is now making inroads in the region with its 3DEXPERIENCE industrial software platform. Philippe Audrain, business development and consultant director, Energy & Materials, speaks to *Oil Review Middle East* about the company's strategy.

“SEVERAL YEARS AGO the company defined a different way of selling its software technologies, identifying 11 industries for which it has developed specific targeted software solutions, one being energy and materials,” says Audrain, by way of background. “This one covers five segments: mining; metals and minerals; oil and gas; chemicals; and power.”

Explaining the connection between energy and materials, he points out that all five segments have energy and materials components. Petroleum, for example, represents close to 100 per cent of the energy used for global transportation, while natural gas is the main source of industrial heat to make commodities such as glass, steel and cement. Fertilisers, plastics and fabrics are also derived from oil and gas, as are petrochemicals.

“The strategy led by our CEO is to target sustainability, to help our customers to be sustainable and cope with the challenges related to climate change, and to promote positive messages of the oil industry in the face of climate change pressures,” he says.

## Promoting value

So how is the company promoting value in the oil and gas industry?

Discussing the business model of the industry today, Audrain says, “Most oil and gas companies have facilities to transform crude into sellable products. There is an ecosystem of contractors to build and maintain these facilities, which produce mostly commodity products, either gasoline or similar for transportation, or added value products with petrochemicals production capabilities. They need to distribute them through dedicated channels down to their customers, many of them being end users in gas stations.

“With our solutions, we are improving several key aspects of the model – from optimising capital projects to enhancing plant operation efficiency, to providing a better value proposal to reduce costs of crude oil derivative products, improving base products, distribution and transport, and the relationship of the ecosystem with contractors.”

## Three families of solutions

This is addressed through an extended solutions portfolio, comprising three main families.

“The first family focuses on the lifecycle of production facilities from the design and construction of these facilities, which involve huge CAPEX, improving the return on these projects by delivering those on time, on budget and with the right quality, to improving operational efficiency during operations and maintenance. This is our core offering today, as we have key differentiators compared to our competitors to enable digital continuity all along the asset life.”

Audrain sees particularly good prospects for this family given the

Image Credit : Dassault Systèmes



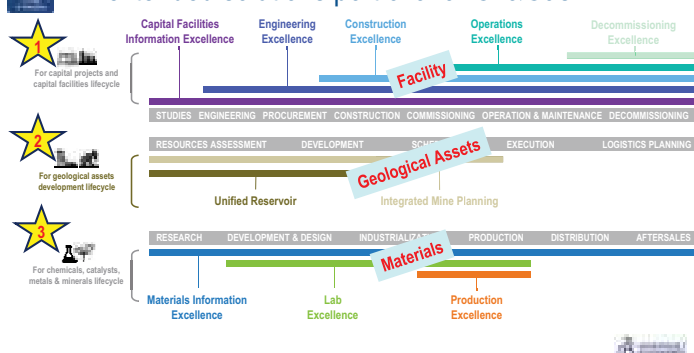
O&G Business Model Canvas Today: our Value Proposition



Image Credit : Dassault Systèmes



An extended solutions portfolio for Oil&Gas



current industry turmoil and the reluctance of operators to invest in major new capital projects.

“Capital projects are more and more pain points for this industry; we are in discussions with all major oil and gas companies, who have faced difficulties on previous capital projects and are looking to do things a different way. The big engineering companies are also having a tough time with the reluctance of their customers to start new projects. The message we are trying to convey, both to the operators and the major EPCs in the Middle East, is the need to change the capital project management paradigm to increase efficiency in both projects and operations. Those who do this in difficult times are the ones who



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will gain when times get better. Some of them have taken this on board, and are investing with us, even if it is a difficult time for them.

"One of the solutions we have embodied into this family is DELMIA Quintiq, which is used by a number of oil and gas operators in the Middle East and focuses on supply chain optimisation," he continues. The aim here is to enable operators to deliver reliable and predictable performance. This encompasses sales and operations planning, master production scheduling, production scheduling and transportation planning. It could for example focus on a masterplan optimisation for one facility or one set of facilities, right down to the scheduling of daily activities in a single facility.

The second family focuses on the lifecycle of geological assets.

"A key part of the capital value of any oil and gas company is their oil and gas reserves, how to make them sustainable, use them at the right time, increase recovery etc.," Audrain explains. "Our Unified Reservoir solution complements well-known legacy solutions from Schlumberger, Halliburton and others. We have an interesting footprint, and while we are not a major player in this area, we offer unique value.

"The third family concerns innovational materials – how to innovate on new materials and end products to address new markets, innovate on additives and catalysts to improve refinery operations."

## Key priority

Saudi Aramco is a major player and a key priority for the company in the Middle East. In October, Dassault Systèmes signed an MoU with Saudi Aramco to partner on 4IR technologies and advanced materials across five domains.

While the Dassault name has opened doors in other areas such as

aerospace, the company has had to demonstrate that it is providing value in petroleum, Audrain comments.

So what sets the company apart from its competitors?

"The main differentiator is our software platform approach," says Audrain. "We are no longer just selling dedicated discipline by discipline tools. Many discipline engineers are very fond of our specialised solutions, but at the end of the day we accelerated the creation of silos, as most common discipline solutions are not really communicating with each other. While we are continuing to sell different technology software solutions, we are focusing on a platform where they can exchange and enhance collaborative work.

"The other differentiator is horizontal digital continuity. With our solutions, any information you get and manage on your project, you can then use after commissioning and handover in operations and maintenance if relevant, providing digital continuity. We are in fact providing digital twins during the project and then during operations and maintenance."

And what of the future? The energy transformation will have a huge impact, he says.

"Over the next 20 years, oil and gas companies will have to take into consideration more and more the climate change and EV effects. If there is a worldwide transfer to EVs, they will need to develop new uses for their crude. Most of our customers in the Middle East are starting to think about it. Some might transform part of their activities into electricity provision, using gas to produce electricity, and others will look to shift the focus from upstream to downstream.

"They won't just want to sell crude, they will want to sell high end value products." ■

## HUBER+SUHNER launches lightweight cable

HUBER+SUHNER, A MANUFACTURER of components and system solutions for electrical and optical connectivity, has launched its fire-resistant RADOX OFL (Oil and Gas Flexible Lightweight) cable solution.

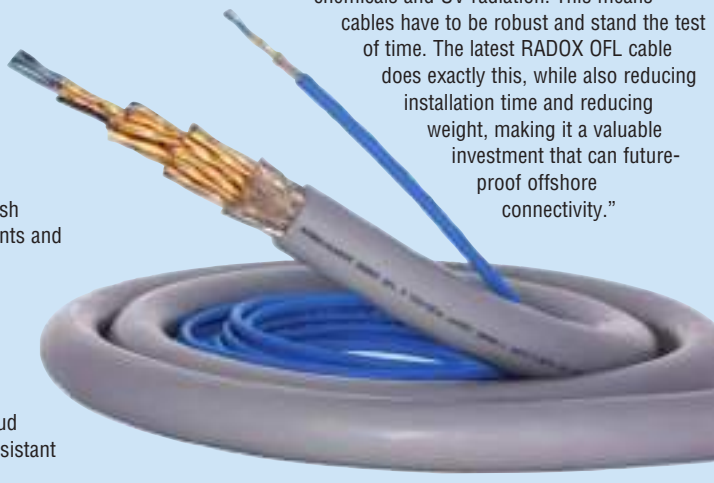
Featuring a lightweight and compact design, RADOX OFL cables reduce weight and space by up to 60 per cent compared to other cables on the market. The cable's small bend radius and thin wall – which is half the size of standard cables – reduces stripping time by 60 per cent, making installation easier and quicker. This has the potential to save industrial and offshore facilities several hundred thousands of dollars in a structural design by overcoming space and weight restrictions, the company says.

The cable is fire-resistant and low smoke halogen-free (LSFH), which provides exceptional performance in harsh outdoor environments and offshore industrial applications. Core cables do not melt or drip in the event of a short circuit. The OFL cable is also oil, mud and hydraulic oil resistant

according to the highest standard NEK606 Cat. a-d.

In addition, the RADOX technology offers a 120°C sheath and 145°C core temperature threshold, giving the cable an expected lifetime which is eight times longer than standard 90°C offshore cables. With RADOX technology, the polymers in the insulation of the wires and in the cable sheath are cross-linked using electron beams. This transformation provides the cables with extreme resistance to mechanical, chemical, temperature and weather influences.

Frank Thorn, head of Market Unit Industry, Low-Frequency division of HUBER+SUHNER, said, "The offshore industry presents challenging conditions, including high temperatures, oil, chemicals and UV radiation. This means cables have to be robust and stand the test of time. The latest RADOX OFL cable does exactly this, while also reducing installation time and reducing weight, making it a valuable investment that can future-proof offshore connectivity."



## New partnership to enable AI in E&P

SCHLUMBERGER AND DATAIKU have entered into a technology partnership that will enable the E&P industry to build and deploy their own artificial intelligence (AI) solutions across the full breadth of their upstream workflows within the DELFI cognitive E&P environment.

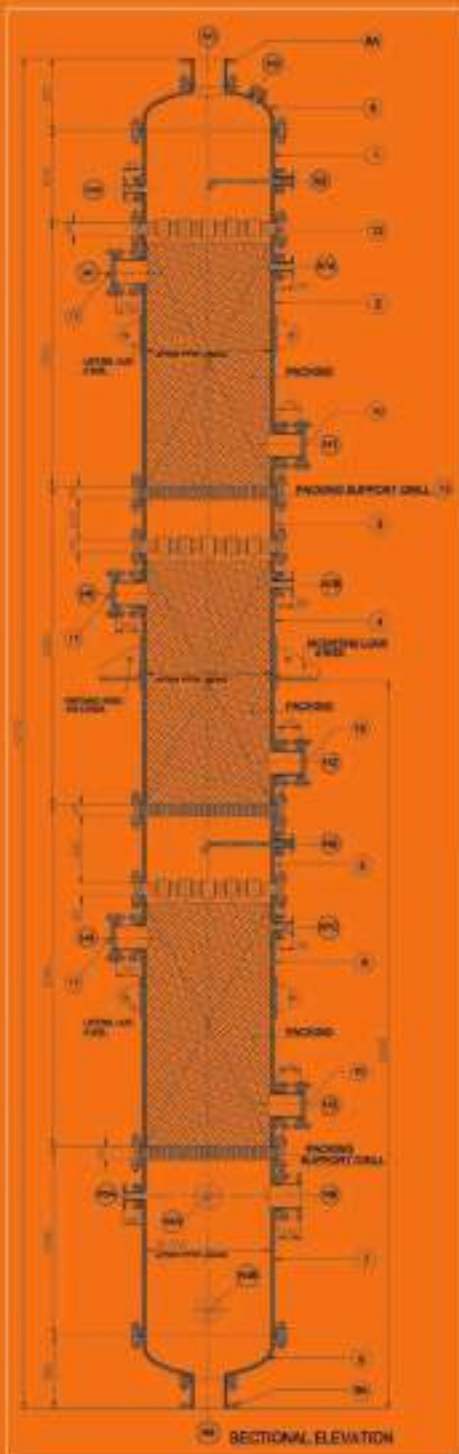
The partnership is expected to deliver unprecedented capabilities to petrotechnical domain experts in response to the global demand for AI, bridging the gap between machine learning and domain expertise to enable better insights.

The industry will have access to an innovation platform where data scientists – experts in the development of AI solutions – can accelerate the deployment of new solutions across their organisations. In addition, making Dataiku technology available in the DELFI environment equips petrotechnical experts to build and extend workflows by leveraging machine learning and data science capabilities that are supported by a rich algorithm library.

Combining existing Schlumberger digital tools and solutions with the proven enterprise AI technology from Dataiku means a ready-to-deploy full machine learning solution will be available at an enterprise scale to the E&P industry.



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# Optimising reservoir sweep in fractured reservoirs

Annabel Green, chief technology officer – Tendeka, outlines the company’s new technology to increase oil recovery by improving water injection in fractured reservoirs.

**I**N MANY OIL reservoirs, ultimate recovery can be improved through the injection of water for both pressure support and flood of the reservoir to sweep residual oil towards the producer wells.

To generate effective sweep, the injected water must be distributed uniformly into the reservoir structure. Reservoir heterogeneity, fractures and faults and frictional pressure losses all lead to inefficient sweep, bypassed oil, and early water breakthrough into production wells.

In the naturally fractured carbonate reservoirs commonly encountered in the Middle East, water injection can be particularly beneficial due to the low reservoir energy and oil wet rock resulting in poor oil recovery. However, achieving conformance is highly challenging due to the complex pore systems and fracture system, and the presence of highly conductive fractures or thief zones providing short-circuits to the production wells.

## Overcoming injected water challenges

Injection control devices (ICDs) can provide a cost-effective means of effectively distributing flow and have been widely implemented. Deployed as part of the lower completion or retrofitted into an existing well, the lower completion is segmented into multiple zones or compartments with one or more devices per zone.

ICDs have a fixed geometry which cannot be adjusted once installed. Effective design of the completion relies on accurate modelling and predictable permeabilities over the life of the well, which becomes increasingly difficult in complex naturally fractured reservoir, or when water injection changes the reservoir characteristics over time.

A common means of achieving the required adjustability is to install fixed orifice ICDs within sliding sleeve assemblies. This allows the compartment to be closed with mechanical intervention following injection logging.

To enable the optimum ICD setting to be achieved without fracture thief zone identification or mechanical intervention, Tendeka has developed FloFuse, a new technology to help optimise oil recovery in these applications (Figure 1).

As a reactive or autonomous ICD technology, this provides operators a cost-effective means of effectively distributing flow in complex and dynamic water injection applications. Increased oil recovery is achieved by improving injected water conformance in fractured reservoirs or by ensuring effective placement of matrix stimulation acids.

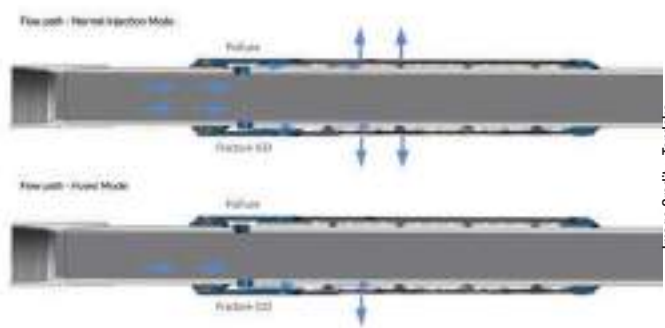


Figure 1: Tendeka’s FloFuse system helps increase oil recovery by improved injected water conformance in fractured reservoirs or by ensuring effective placement of matrix stimulation acids.

## Improving injection distribution

ICDs simply provide a flow restriction across the completion, creating a pressure drop as a function of the flowrate into the zone. This relationship can be engineered by changing the size or quantity of the ICDs.

In high injectivity compartments, which have a higher rate capacity, the additional pressure drop provided by ICDs acts to limit injection into the compartment diverting water to the lower injectivity zones. In low injectivity zones, the rate and therefore the pressure drop across the ICD is lower, resulting in increased water injection into the zone. Thereby, flow distribution is achieved.

For applications with a correctly designed completion, this technology has been proven to be highly effective in improving injection distribution. As a ‘rule of thumb’, the greater the contrast in permeability, the more restrictive the ICD is required to be to manage outflow in the high injectivity compartment. To effectively manage flow distribution in a reservoir with highly conductive fractures, it is necessary to deploy highly restrictive ICDs in the compartments containing the fractures in order to accommodate the large injectivity contrast between the reservoir pore structure.

## Integrity and reliability

While the benefits of passive ICDs in injection wells can be demonstrated, the challenge for both production and injection applications with ICDs is the detection and identification of thief zones during reservoir characterisation and logging of the wellbore. In injection applications, there is the added challenge of changes in permeability over time due to induced fracturing, formation damage and stimulation treatment. Tendeka has leveraged its extensive experience in AICD technology to solve this very real industry problem.

“Achieving conformance is highly challenging due to the complex pore systems and fracture system.”





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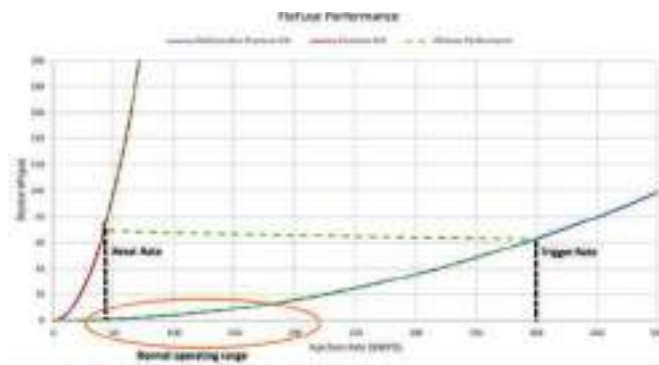


Image Credit : Tendeka

Figure 2: Pressure drop across the system is shown as a function of flow rate. The blue curve depicts the baseline performance created by the combined flow area of the FloFuse and the fracture ICD. The red curve depicts baseline performance of fracture ICD. The green dotted line shows FloFuse performance as it switches between these two baselines.

FloFuse autonomously changes the ICD design to effectively restrict injection into thief zones or large fractures that dominate the outflow profile, ensuring effective injection into the rock matrix or fracture structure.

By triggering at a pre-determined flowrate, it reduces the outflow area in the completion compartment. Furthermore, the dynamic and reversible operation of the valve makes it suitable for applications where the permeability contrasts change over time.

Unlike conventional water flood management technologies, FloFuse devices are easy to run in horizontal wells and high rate environments and have a longer life expectancy, with less need for maintenance.

Figure 2 shows the performance of the FloFuse system in more detail. The completion is designed so that effective conformance into the matrix or pore structure can be achieved in the 'normal operating range' with the combined flow area of the FloFuse and fracture ICD. In this setup, when the rate through the sand control joint exceeds 400 bpd, the FloFuse will trigger shifting the performance to the fracture ICD. Conversely, when the rate through the fracture ICD drops below 45 bpd, the system will revert to the less restrictive baseline.

**“ FloFuse devices are easy to run in horizontal wells and high rate environments.”**

If a fracture is encountered which causes the flow rate to increase, the device will trigger to provide a more restrictive setting for effective control of flow into the fracture.

It achieves this effect using a dual ICD set-up where devices are mounted into the completion base pipe. Injected water passes through the ICDs into a housing mounted at one end, through the housing to the underside of the screen section and then out into the annulus between the screen and the formation.

Designed initially to address the problems of providing a cost-effective, intervention-free, life-of-well solution for water injection wells, it can also provide an effective resolution in reservoir stimulation operations.

Once installed, FloFuse will work repeatedly to effectively distribute stimulation treatments as often as required, greatly simplifying operations over time. The device allows the optimum setting to be maintained for both injection into the pore spaces and for effective fracture control. This is executed whilst retaining the cost-effective benefits and robustness of ICD for life-of-well operations. It has performed extremely well in simulated operations and static well modelling, and was recently installed in an application in the Middle East. ■





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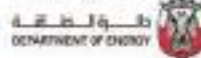
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# Reaching the next frontier with AI and advanced analytics

The potential of AI to deliver positive change across the asset-intensive industries is vast when delivered in the right context, says Antonio Pietri, president and CEO, Aspen Technology.

**T**ECHNOLOGY SERVING THE asset-intensive industries has been on a long and complex journey over the past four decades. Today, the journey has been given new momentum with the shift to artificial intelligence (AI), machine learning and advanced analytics.

It is this latest evolution in the technology landscape that is helping operators enhance safety, improve operational excellence and drive profitability by quickly finding the sources of uptime losses and margin leakage, and then identifying the causes of such events and promoting the best possible outcomes.

However, it is also important to highlight that technology by itself will never “move the needle.”

What is critical is the intimate relationship between the technology (which must be proven and referenceable and not a science project), the methodology built into the product (to simplify and hasten the building of software solutions) and then the work process (that any solution demands of the end user to respond to any analytical discovery or alert that the software produces). At the heart of all this is the data that technology providers can process to uncover meaningful relationships, which then help companies understand what’s happening and what may happen in order to make informed decisions.

In recent years, data analytics has become essential for industrial manufacturing. However, results are very sensitive to the context of the data, and too often the data analysis produces faulty outcomes. I have heard it said, “Just give me the data, and I will sort out the problems.”

Unfortunately, it does not work that way. Data science alone is not enough – and AI/machine learning is not a silver bullet for industry. It needs “guidesrails” to find correct answers; otherwise it finds random correlations (one well-known example of that is data that links the consumption of more margarine to the likelihood of divorce in the US state of Maine). Guidesrails may come from experienced staff that rely on and share their



**Antonio Pietri, president and CEO, Aspen Technology.**

Image Credit : Aspen Technology

understanding of asset behaviour. They also arrive from complex first-principle and empirical models that forecast the likelihood of specific results.

Process modelling experience is critical in offering contextual data limits which establish reasonable expectations of behaviour and exclude meaningless correlations that machine learning will find. Effective solutions always require the marriage of what is known about manufacturing process and equipment behaviour, combined with analytical techniques. These guidesrails need to be tough and robust.

The key here is making the products fit the artisan, rather than making the artisan learn heady new skills. Furthermore, to be practicable in the real world, AI technologies must fit with the skillsets of current staff without needing data science experts. AI-driven products must slip precisely into existing work processes. Low-touch techniques can help by effectively streamlining and simplifying AI so that regular employees can deploy intensely technical machine learning solutions easily and rapidly.

When delivered in this context, the potential of AI to deliver positive change across the asset-intensive industries is vast. AI can do work that humans cannot, recognising multi-dimensional and temporal patterns that evade human capabilities and doing repetitive tasks faster, 24/7, forever.

Driven by the latest capabilities, current planning and scheduling products can model performance based on estimates of future feedstocks, qualities and expected market behaviours. However, as we get closer to the actual run-time events, the estimates must become firmer and closer to the actual conditions – and perhaps deviate from earlier modelled conditions. Now, AI techniques can be further applied to trim models to run-time conditions, continuously assuring greater precision and accuracy and enabling the tighter control of yields, qualities and profit-making opportunities in real time.

In addition, such AI solutions can rapidly and continuously monitor asset health, determining patterns of normal and errant behavior in equipment and manufacturing processes. They predict impending degradation and failure with weeks – or even months – of notice, thereby allowing timely action to avoid breakdowns. And they enable the scheduling of the shortest, safest repair events, thus maximising uptime and profitability.

Ultimately, from the company’s perspective it is about reducing time-to-value, where vendor products do the work so that they don’t have to. That includes automating the workflow, reducing skills and experience needed and minimising the time required to prepare data.

Remember, it always takes carefully “framed” data sets to secure precise outcomes – that is, data framed by context from understanding. It is this combination of domain knowledge and AI that can deliver accurate and trusted results, helping companies across the asset-intensive industries ensure safety, drive efficiencies and maximise profitability. ■



## Leading in pipeline innovation with thermoplastic technology

DUTCH COMPANY SOLUFORCE, which develops, manufactures and markets Flexible Composite Pipe (FCP) or reinforced thermoplastic pipe (RTP) systems, is working on a number of innovations as it continues to evolve its markets and products.

“Our mission is to revolutionise the way energy is transported, by offering solutions that help cut cost and make operations safe, durable and efficient,” the company said.

Since 2000, SoluForce has installed more than 3,500 km of SoluForce FCP around the world in on- and offshore applications.

It noted that while each year billions of dollars are invested in ageing pipelines in the Middle East, the majority of these investments are literally corroding away. The assurance of reliable output is vital to oil and gas pipeline operators, so many oil and gas companies are already using RTP pipes.

SoluForce said it was the first company to develop RTP back in 1998, and also the first RTP to be installed in the Middle East in 2000. While striving to be a leader in innovations, it has developed the industry’s only true gas tight RTP (SoluForce GT) and high-temperature RTP solution with design temperatures of 105°C/225°F (SoluForce HT).



Image Credit : Soluforce

Many oil and gas companies are turning to RTP pipes.

A hydrogen version of its gas tight pipe, called SoluForce H2T, was recently certified for hydrogen applications of up to 42 bar of operating pressure, at a maximum operating temperature of 65°C, making it unique in the world of hydrogen transport and a global first. This milestone has a major impact on the feasibility of hydrogen, will

accelerate the energy transition and is a new step towards a sustainable energy mix.

“With a number of innovations to come, we are continuing to evolve our RTP markets and products, which will enable us to continue to develop and cement our business in the region,” Soluforce said.

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## Utilising flare gas to generate power in the oil and gas sector

DYNAMIC EXPANSION OF the oil and gas industry continues to fuel the demand for new technologies that tackle the impact of flare gas emissions globally.

While the production of oil has grown by roughly 30 per cent over the past two decades, the climate impact of flare gas, typically considered a waste by-product by the oil and gas industry, continues to be of concern. Globally, 140 million cubic metres of natural gas are flared annually, emitting more than 300 million tons of carbon dioxide (CO<sub>2</sub>) into the environment.

According to Cummins, a lack of infrastructure to capture and sell the flare gas released when drilling for oil is a major environmental problem. Billions of dollars in wasted natural gas could be used to generate reliable, affordable electricity and yield billions more per year in increased global economic output.

"Governments, development institutions and oil companies around the world are being pressured to look at the amount of money spent in gas flaring and the damage it is causing to the environment," said Linda



The Cummins HSK78G series is powered by natural gas.

Nezerwe, technical specialist at Cummins, and expert in emissions control for both diesel and gas generator sets. The company recently launched the HSK78G natural gas generator series, designed to provide reliable power regardless of the natural gas source or the climate, and capable of generating power from very aggressive fuels otherwise considered waste products.

"The quantity of unburned fuel that needs to be flared is usually known, but the question is what to do with it," she added.

The World Bank, which has launched an initiative called Zero Routine Flaring by 2030, has stated that if this amount of gas were used for power generation, it could provide about 750 billion kWh of electricity, or more than the African continent's current annual electricity consumption. While associated gas cannot always be used to produce power, it can often be utilised in a number of other productive ways or conserved.

"A critical development for the oil and gas industry is the advancing technology in natural gas generators to utilise fuel sources that would otherwise be considered water products," continues Nezerwe. "This leads to robust power solutions even with very aggressive fuels with minimal derating. The result is that routine flaring can be reduced and transformed into a more environment friendly option while also helping communities through the supply of electricity."

These advancements in power generation applications allow operators to utilise environmentally harmful raw flare gas for diverse purposes instead of simply burning it, with clear benefits to the environment.

## GPT unveils next generation fully-coated isolation gasket

GARLOCK PIPELINE TECHNOLOGIES (GPT) – a leading manufacturer of critical pipeline sealing and electrical isolation products – has announced the unveiling of EVOLUTION.

The next generation of isolation gaskets, EVOLUTION features easier installation, tight sealing, high-temperature operation, no permeation, hydrotesting isolation, fire safety and chemical resistance.

Featuring a thinner, 1/8" design, EVOLUTION minimises the difficulties often encountered when attempting to install thicker isolating gaskets. The full-coating encapsulation allows the gasket to be hydrotested and left in the pipeline with the same

isolation properties as before it was tested.

EVOLUTION's coating (a GPT proprietary material) is extremely abrasion and impact resistant while providing chemical resistance to H<sub>2</sub>S, steam, CO, CO<sub>2</sub> and other chemicals often found in oil and gas pipelines. This fully encapsulated coating also prevents the need for expensive exotic cores, as it eliminates contact to exposed metal.

The EVOLUTION gasket features the highest tightness parameters for any product available in the market today. With demands placed on the oil and gas industry to improve leakage rates, the increased levels of tightness achieved will exceed

requirements and result in greater joint integrity.

An acceleration in H<sub>2</sub>S levels as operators drill deeper and more aggressively causes traditional GRE products to become vulnerable over time. Through extensive testing, EVOLUTION has demonstrated virtually no permeation or degradation, eliminating this costly problem.

EVOLUTION provides the highest pressure rating of any isolating gasket available. Unlike GRE gaskets, which are prone to delamination, EVOLUTION has no laminations and as a result can better withstand high-pressure environments.

Rated to 500°F (260°C), EVOLUTION can operate under high temperatures. Tested comprehensively for safety, the product has API 6FB, 3rd Edition Fire Test recognition.

"As its name implies, EVOLUTION is the next step in gasket technology and is poised to eliminate a number of issues that plagued gaskets in previous iterations," said Tim Hurley, GPT senior global product manager. "EVOLUTION was designed to take the best available technology for pipeline isolation and incorporate all of these benefits into one comprehensive product."

As with existing GPT high pressure isolation gaskets, EVOLUTION features pressure-energised seals, a fire safe Inconel 718 c-ring, built to match pipe bore, a short moment arm, moisture and humidity resistance, zero creep relaxation and a 316LSS core.

EVOLUTION gaskets are available from 7 January 2020.



Image Credit: GPT

EVOLUTION, the fully-coated isolation gasket.

For more information, visit [www.gptindustries.com/evolution](http://www.gptindustries.com/evolution).



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## AVEVA enhances value chain optimisation software for operational excellence

AVEVA, A GLOBAL leader in industrial software, has announced enhancements to its Value Chain Optimisation offering to enable customers to eliminate information silos and integrate critical business processes across the operational value chain.

AVEVA's Value Chain Optimisation solution brings together software from across its portfolio that helps operators and manufacturers manage their supply chain, operations and process optimisation across key industries including refining, petrochemicals, metals, mining and materials, food and beverage, consumer packaged goods (CPG), water and wastewater. It helps operators drive efficiency, make better and faster decisions, reduce cost and create new opportunities across the operations value chain.

"Companies are dealing with a legacy of disconnected processes, and working to bridge them to create end-to-end visibility is the foundation for operational digital transformation," said Harpreet Gulati, head of Planning and Operations, AVEVA. "Value Chain Optimisation presents a unique opportunity to orchestrate all business and operations activities across the



Image Credit: AVEVA

Harpreet Gulati, head of planning and operations at AVEVA.

supply chain from feedstock acquisition, planning, scheduling, operations and distribution. AVEVA's Value Chain Optimisation solutions have enabled organisations globally to transform their operations, by improving refining margins by up to US\$0.70/barrel, improving mining asset utilisation by 20 per cent, reducing water use by 30 per cent, and improving productivity by 20 per cent in food processing."

Industrial operations have grown over the last

20 years with poor integration from a legacy of point solutions involving manual data transfer or custom software, which has resulted in operational silos across the value chain. AVEVA's strategy helps organisations address these challenges and create a collaborative environment instead of business or process silos. In this way the operations lifecycle can be managed in a comprehensive, flexible and connected manner that brings transparency to the decision-making process across the value chain.

"AVEVA's Value Chain Optimisation solutions combine Cloud technology and Digital Twin innovations with analytics to help operators break down silos and foster better collaboration, enabling our customers to realise the benefit that comes with unlocking their value chain," said Gulati.

AVEVA's Value Chain Optimisation is already successfully deployed by several multinational companies globally. Abu Dhabi National Oil Company (ADNOC) has reported benefits of US\$60-100mn from integrated production planning, while BP Plc has cut crude purchase decision time from two days to less than two hours.

## Saga Group continues to move ahead in quality manufacturing

SINCE 1984, THE Saga Group has practiced a customer-first approach to delivering customised cementing accessory solutions to an expanding global market. Constantly seeking improvement and diversity, Saga has expanded their product and services portfolio over the years to include production chokes, drill-stem testing and casing packers.

Now, in recognition of Saga's total commitment to quality, PT Sagatrade Murni has been awarded API 11D1 certification for their manufacturing processes of liner hanger and production packers at their engineering facility at Samarinda, Indonesia. This qualification offers customers further assurance of Saga's unwavering commitment to excellence, quality and reliability. PT Sagatrade Murni is the first API 11D1 certification awarded in Indonesia, a considerable achievement and a major stepping-stone to opening new markets for customers who demand high quality specifications.

Kim Sadler, Saga's director Middle East & Africa explains how API 11D1 has become essential to maintain Saga's quality standards. "We have been working diligently to achieve API 11D1. Our philosophy has always been to deliver the highest quality oilfield tools and the best service at all times.



Saga maintains the highest quality standards.

Image Credit: Saga Group

When our customers started applying API 11D1 standards to projects with liner hanger packers, we moved very swiftly to meet those demands."

PT Sagatrade Murni's director of Operations in Indonesia, Tony Beale offers some insight into the thoroughness of the process. "There are six grades of API 11D1 from the lowest at V6 to the highest V0. V0 is the most difficult to achieve and we have qualified for all six grades, proving we have a first-class QMS."

Recently, Saga has won new contracts supplying liner hanger equipment and services in the Middle East and has augmented its manufacturing capacity in the Samarinda facility to meet the increased demand. As Kim Sadler points out, "The need for increased range and higher specifications never ceases, and gaining API 11D1 is another step we've taken to ensure our products are meeting the highest quality and consistency."

For more information regarding Saga PCE liner hanger equipment and services, Kim Sadler can be contacted at kims@sagapce.com. For information regarding PT Sagatrade Murni, contact Tony Beale at tonyb@sagatrade.co.id.

Saga PCE is headquartered in Singapore and is the exclusive worldwide distributor for PT Sagatrade Murni products and services.



Saga has expanded its product and service portfolio over the years.

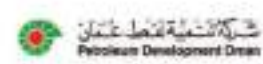
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## UNICUS 4i – the new standard for stationary high pressure breathing air compressors

BAUER COMPRESSORS, INC., a leader in high pressure breathing air compressor systems and components, has created what it says is the most technologically advanced compressor system in the industry.

UNICUS 4i is an “All-In-One” compressor package which centralises all high-pressure breathing air system components into one appliance-type package. Central to the package is an air-cooled compressor coupled to a high-pressure breathing air purification system.

Imagine an operator interface similar to your smart phone. UNICUS 4i incorporates this same touchscreen technology to the operations panel, providing immediate operator interface with the unit for system operations and fault condition assessment. You can turn the compressor on or off from one touchscreen; control the processed air into or out of the onboard ASME air storage cylinders with the tap of a screen; or perhaps fill your SCBA cylinders within a 3-position NFPA compliant containment fill station while at the same time controlling the function of individual fill



Image Credit : BAUER Kompressoren

*The Unicus 4i compressor.*

pressures at each SCBA filling position.

If obtaining an accurate air sample for analysis and locating a qualified lab has been an issue, BAUER's Lab On Locale 2 is a proprietary option which takes the guesswork out of the equation. A specific hardware

component is integrated into UNICUS 4i, and a keystroke on the operator interface provides immediate access to a qualified third party lab over the internet. BAUER can install a cell phone modem for customers without access to an internet connection.

Regarding data logging, did you know that every SCBA fill sequence should be logged in accordance with NFPA? If you are not logging the data and an accident occurs, who knows the history of the SCBA, or how do you know who filled the cylinder? BAUER's optional RFID Technology utilises proprietary antennas to read SCBA tags to record all data in accordance with NFPA.

In recognition of the fact that not everyone has the same gas monitoring requirements, the company's optional Gas-Tek sensor technology allows customers to tailor gas monitoring requirements to their specific needs. Included in its Gas-Tek system is a fault alarm with shutdown to prohibit it from processing contaminated air.

BAUER manufactures all the key components within the UNICUS 4i system, so when you think high pressure breathing air, think BAUER.

## Flexible, mobile system for the installation of connectors

PLANTS FOR OIL and gas processing are home to numerous hydraulic systems with extensive pipework networks. A versatile mobile machine is now available from Stauff for installing cutting ring connectors into the lines.

For installing or repairing line systems on site, the new installation machine from the Stauff Press range, with product designation SPR-PRC-H-M, provides many advantages.

This machine can be used practically anywhere in the plant. It is ideal for the pressure-controlled installation of all common cutting ring models to the ends of tubes made of steel, stainless steel and other materials up to an outer diameter of 42mm (Light Series) or 38mm (Heavy Series). Its use guarantees high-quality reproducible assembly results – even with different tube diameters and materials.

The machine boasts two features that enable it to be used on-site as a mobile unit. The machine is compact in design and – along with accessories and other installation tools – is carried in a transportation case on rollers. It weighs less than 7kg (including battery). The machine can be used as a manual tool or can be installed on a tripod or fitted with a table mounting.

As a ‘stand-alone’ solution, the machine is powered by an efficient lithium-ion battery that can typically carry out more than 200 installation procedures without having to be recharged between installations, depending on the diameter of the tubes. A replacement battery is included in the service case as standard. There is also room in the case for the appropriate charging unit.

The machine works on the principle of pressure-controlled installation. The setting parameters recommended for the individual diameters of the steel / steel material combinations are printed directly on the machine and are therefore always to hand. The values can also be adapted for other materials and material combinations, on request, and entered easily using the setting wheel on the machine. The installation results are visually checked and evaluated using the clearly visible raised material in front of the first cutting edge of the ring – as is usually the case with cutting ring connectors.



*The new mobile installation machine in the Stauff Press range is ideal for use on site.*

Image Credit : Walter Stauffenberg GmbH & Co. KG

As users require only a few seconds to change the tool and alter the installation parameters using the setting wheel, tube connectors of different sizes, series and materials can be efficiently installed. This ensures constantly good process safety and reliability.

Compared to purely manual installation, the use of the installation machine offers the benefit that installation personnel can work more quickly and under less pressure. There is also a significantly lower risk of incorrect or over- or under-tightening, with the resulting risk of leakages, and machine-assisted installation of cutting rings delivers improved process reliability.

These properties make the new installation machine ideal for flexible on-site use. It is also ideal for the series installation of smaller quantities and for applications in service vehicles and in the workshops of hydraulic repair and maintenance service providers.



## Helping to protect the environment

AL KHOBAR-BASED DLPS has completed a project for Saudi Kayan Petrochemical Company to reduce the odours, emissions, BTEX/VOC and organic growth in their waste water basins. The total area that protected is 4,800 sq m.

The patented Hexa-Cover floating cover is the perfect solution to eliminate emissions, evaporation, organic growth, odour and heat loss. Through its patented design, the floating cover ensures up to 99.9 per cent coverage of the surface area.

The Hexa-Cover floating cover has been designed as a hexagonal element with symmetric ribs on both sides. The ribs make the floating elements distribute themselves naturally and uniformly on the liquid surface without overlapping. A specific gravity of 0.5 kg/l ensures that the elements will be level with the surface. The unique design makes the elements interlock by wind pressure and ensure that the floating cover mechanically constitutes a coherent cover.

Hexa-Cover tiles are manufactured from recycled plastic with no use of Freon or the like.

*The Hexa-Cover can eliminate emissions, odour, organic growth, evaporation and heat loss.*



Image Credit : DLPS

The installation process is extremely easy. Hexa-Cover is delivered in large bags, and is easily poured onto the water surface where it will distribute itself automatically, and form a closed cover.

Hexa-Cover floating covers are an investment that will not require any further

expenses, such as operating costs or repair.

Whenever needed, access to the water is possible anywhere and at any time. The floating covers can be simply pushed aside with the equipment e.g. a pump, a hose or a mixer. When the equipment is removed, the tiles will reorganise and close the openings.

## New 5,000 HP Quintuplex pump

*The Thunder 5,000 HP Quintuplex pump.*

Image Credit : Gardner Denver



GARDNER DENVER PETROLEUM & Industrial Pumps (P&IP) has introduced the new Thunder 5,000 HP Quintuplex pump. The pump is designed for dual-fuel gas engines, electric motors, diesel engines and gas turbine direct drives.

With stainless steel construction and innovative geometry designed to minimise stress, the Thunder 5,000 HP Quintuplex pump features a range of next generation fluid end technology. The pump's 11 in. stroke length meets or exceeds the pressure and flow output of high rod load/short stroke (8 in.) pumps, and can increase consumable life by 37 per cent.

Edward Bayhi, vice president and general manager, Petroleum & Industrial Pump Division, said, "Operators can now substantially decrease their consumable cost and fatigue cycles due to the pump's long stroke advantage. This means slower operating speeds can be maintained, resulting in longer consumable life and reduced fatigue cycles. The same flow rate can be achieved with smaller plungers, reducing operating load on the pump, leading to extended pump life and less downtime."

Bayhi added, "The Thunder 5,000 HP Quintuplex pump is offered in combination with Redline Packing. This is the critical seal system in the heart of the pump, which substantially improves performance in harsh conditions, extends maintenance intervals, reduces downtime and ultimately increases profit margins for our clients."

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# Project Databank

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## OIL, GAS AND PETROCHEMICAL PROJECTS - SAUDI ARABIA

Project	City	Facility	Budget (US\$)	Status
Advanced Petrochemical - SK Gas - Isopropanol Plant	Jubail	Ethylene	100,000,000	Project Announced
Advanced Petrochemical - SK Gas - Polypropylene (PP) Compounding Plant	Jubail	Polypropylene	40,000,000	Project Announced
Advanced Petrochemical - SK Gas - Propane Dehydrogenation (PDH) and Polypropylene (PP) Complex	Jubail	Polypropylene	1,800,000,000	Project Announced
Dow - Polymers Production Facility	Jubail	Polymers	100,000,000	Feasibility Study
Farabi Petrochemicals Company - Yanbu Linear Alkyl Benzene (LAB) Plant	Yanbu	Linear Alkyl Benzene (LAB)	450,000,000	Construction
INOCHEM - Soda Ash and Calcium Chloride Complex	Ras Al Khair	Detergents	300,000,000	Construction
JUPC - Ethylene Oxide/Ethylene Glycol (EO/EG) Plant III	Jubail	Ethylene Oxide	700,000,000	Construction
Midchem - Riyadh - Chlor Alkali Plant and Calcium Chloride Plant	Riyadh	Chlor Alkali	60,000,000	Engineering & Procurement
NATPET - Yanbu Polypropylene Plant Redevelopment	Yanbu	Polypropylene	72,000,000	Construction
NIGC - Jubail GAS Phase 9	Jubail	Gas Production	900,000,000	Construction
Pan Asia - Jizan City for Basic & Downstream Industries - Purified Terephthalic Acid (PTA) Plant	Jizan	Petrochemical Plant	3,800,000,000	EPC ITB
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Clean Fuel Package	Rabigh	Naptha	950,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Common Facilities (UO2) & Tank Farm Package (UO3)	Rabigh	Naptha	500,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Clean Fuel - Naptha Hydrotreater and SRU	Rabigh	Sulphur Recovery	177,600,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Overview	Rabigh	Aromatics	5,000,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Vanadium Processing Plant & Caustic Soda Disposal Unit	Rabigh	Caustic Soda	220,000,000	Construction
Petrokemya - Jubail - Olefins 1 Plant Expansion	Jubail	Ethylene	80,000,000	EPC ITB
RCC - Hydrocarbon Resin Complex	Jubail	Hydrocarbon Resin	500,000,000	Feasibility Study
Royal Commission for Jubail and Yanbu - KeroTech Industries - Jubail - Kerosene Plant	Jubail	Kerosene	166,000,000	Project Announced
Sabic - Jubail - STC Jubail Utilities Park & Pilot Plants	Jubail	Offsites & Utilities	150,000,000	Engineering & Procurement
Sabic - Saudi Aramco - Yanbu Crude Oil To Chemicals (COTC) Complex	Yanbu	Petrochemical Complex	20,000,000,000	FEED
Sadara - Ethylene Oxide (EO) and Propylene Oxide (PO) Pipeline	Rabigh	Ethylene	40,000,000	FEED
SAGIA - Unibio - Edhafat - BioProtein Facility	Various	Gas Processing	200,000,000	Project Announced
SASREF - Jubail Refinery Modernization and Expansion	Jubail	Petroleum Oil Refinery	360,000,000	Construction
SATORP - Jubail - Debottlenecking Train 2	Jubail	Refinery	200,000,000	Engineering & Procurement
Saudi Aramco - Yanbu to North Jeddah NGL Pipeline	Yanbu	Gas	600,000,000	Construction
Saudi Aramco - Annual Onshore Maintain Potential Programme - (Program)	Red Sea	Maintenance	5,000,000,000	Construction
Saudi Aramco - Arab Heavy Pipeline to Yanbu Crude Oil Terminal	Various	Oil	250,000,000	Construction
Saudi Aramco - Arabiyah and Hasbah Gas Field Development	Arabiyah	Gas Field	3,000,000,000	Construction
Saudi Aramco - Berri - Water Injection System Expansion	Berri	Water Injection	200,000,000	Engineering & Procurement
Saudi Aramco - Berri Gas-Oil Separation Plant Expansion	Berri	GOSP	1,700,000,000	Engineering & Procurement
Saudi Aramco - Berri Offshore Pipeline	Berri	Oil	400,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Downstream Packages	Eastern Region	Gas Processing	650,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Industrial Support Facilities (FISF)	Eastern Region	Gas Treatment Plant	100,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Main Processing Facilities	Eastern Region	Gas Treatment Plant	2,500,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Offsites & Utilities	Eastern Region	Gas Field	2,000,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Overview	Eastern Region	Gas Treatment Plant	6,600,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Residential Camp	Eastern Region	Residential Development	1,500,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Sulphur Recovery Unit SRU	Eastern Region	Gas Treatment Plant	2,500,000,000	Construction
Saudi Aramco - Gas Storage Facilities	Various	Gas Storage Tanks	1,000,000,000	Project Announced
Saudi Aramco - Haradh Gas Increment Program - Freeflow Pipelines	Haradh	Flowlines	470,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program - North Haradh Field Gas Compression Facilities	Haradh	Gas Compression	1,200,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program - South Haradh Field Gas Compression Facilities	Haradh	Flowlines	1,200,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program - Overview	Haradh	Gas Compression	1,200,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program -	Haradh	Gas Compression	1,200,000,000	Construction
Satellite Gas Compression Facilities	Hasbah	Gas Field	1,600,000,000	Construction
Saudi Aramco - Hasbah Field Increment II				
Saudi Aramco - Hawiyah Gas Plant Expansion	Hawiyah	Gas Processing	1,200,000,000	Construction



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# Project Databank

Compiled by Data Media Systems

## OIL, GAS AND PETROCHEMICAL PROJECTS - SAUDI ARABIA

Project	City	Facility	Budget (US\$)	Status
Aramco - Jizan Export Refinery - Naphtha Processing and Aromatics Complex	Jizan	Hydrotreating	1,040,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Overview	Jizan	Petroleum Oil Refinery	2,100,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Sour Water Stripper & Amine Regeneration Unit	Jizan	Oil Production	500,000,000	Construction
Saudi Aramco - Liquefied Natural Gas (LNG) Receiving Terminal	Jeddah	Liquefied Natural Gas (LNG)	200,000,000	Feasibility Study
Saudi Aramco - Marjan Oil Field Expansion - Cogeneration Independent Steam and Power Project (ISPP)	Marjan	Co-Generation	500,000,000	EPC ITB
Saudi Aramco - Marjan Oil Field Expansion - Interlinked Pipeline Installation	Marjan	Gas Pipeline	600,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Overview	Marjan	Oilfield Development	16,000,000,000	Construction
Saudi Aramco - Marjan Oil Field Expansion - Package 1	Marjan	GOSP	5,000,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 10	Marjan	Gas Treatment Plant	1,000,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 11	Marjan	Liquefied Natural Gas (LNG)	1,000,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 12	Marjan	Offsites & Utilities	375,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 14	Marjan	Sulphur Recovery	100,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 16	Marjan	Oil	130,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 17	Marjan	Oil	100,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 18	Marjan	Oil	200,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 2	Marjan	Oilfield Development	400,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 3	Marjan	Water Injection	5,000,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 4	Marjan	Oil & Gas Field	1,500,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 6	Eastern Region	Gas Compression	1,500,000,000	Engineering & Procurement
Saudi Aramco - Marjan Oil Field Expansion - Package 9	Marjan	Gas Compression	1,000,000,000	Engineering & Procurement
Saudi Aramco - Marjan, Berri, Zuluf and Safaniyah Expansion - Overview	Various	Oil & Gas Field	7,000,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Overview	Various	Non Associated Gas	4,050,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase 2 - Package 1 - Western Region Pipeline	Western Region	Gas	830,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase 2 - Package 2 - Central Region Pipeline	Central Region	Gas	367,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase 2 - Package 3 - Eastern Region Pipeline	Eastern Region	Gas	374,000,000	Construction
Saudi Aramco - Multiple Pipelines Revamp	Eastern Region	Gas	250,000,000	Construction
Saudi Aramco - North Jeddah Bulk Plant	Jeddah	Bulk Storage Plant	270,000,000	Construction
Saudi Aramco - Offshore Maintain Potential Programme - (Program)	Various	Oil & Gas Field	7,000,000,000	Construction
Saudi Aramco - Qatif GOSP Pipeline Pumping Expansion	Qatif	Pipeline	100,000,000	Construction
Saudi Aramco - Ras Al Khair - Rig Manufacturing Facility	Ras Al Khair	Rigs	2,000,000,000	Project Announced
Saudi Aramco - Ras Tanura Pipeline	Ras Tanura	Oil	270,000,000	Construction
Saudi Aramco - Ras Tanura Refinery - Aromatics Unit	Ras Tanura	Aromatics	3,500,000,000	Construction
Saudi Aramco - Ras Tanura Refinery - Clean Fuels Project	Ras Tanura	Gasoil	2,000,000,000	Construction
Saudi Aramco - Red Sea - Jazan to Abha Coast Pipeline	Red Sea	Gas	150,000,000	EPC ITB
Saudi Aramco - Safaniya Debottleneck Onshore Plant	Safaniyah	Oil Production	800,000,000	Engineering & Procurement
Saudi Aramco - Safaniyah Expansion	Safaniyah	Offshore Platform	1,500,000,000	Construction
Saudi Aramco - Total - Ineos - Amiral Petrochemical Complex	Jubail	Petrochemical Plant	9,000,000,000	FEED
Saudi Aramco - Unconventional Gas Program - Jafurah Gas Terminal	Al Jafurah	Gas Processing	2,500,000,000	EPC ITB
Saudi Aramco - Unconventional Gas Program - (Program)	Various	Shale Gas	7,000,000,000	EPC ITB
Saudi Aramco - Unconventional Gas Program - South Ghawar Development - Gas Separation Plant	Eastern Region	Gas Treatment Plant	700,000,000	EPC ITB
Saudi Aramco - Unconventional Gas Program - Tight Gas Production Systems A and B - Overview	Turaif	Gas Field Development	3,500,000,000	Construction
Saudi Aramco - Unconventional Gas Program - Tight Gas Production Systems B	Turaif	Gas Field Development	1,000,000,000	Construction
Saudi Aramco - Uthmaniya & Shedgum New Compression Plants	Uthmaniyah	Gas Compression	2,500,000,000	EPC ITB
Saudi Aramco - Uthmaniya Gas Treatment Plant	Uthmaniyah	Gas Treatment Plant	1,000,000,000	Construction
Saudi Aramco - Yanbu - Storage Tanks and Associated Equipment	Yanbu	Gas Storage Tanks	400,000,000	Construction
Saudi Aramco - Zuluf Oilfield Expansion	Zuluf	Oil Field Development	1,700,000,000	Engineering & Procurement
SDC - Jubail - Surfactants Manufacturing Plant	Jubail	Surfactants	50,000,000	FEED
Sibur - Saudi Aramco - Jubail Synthetic Rubber Plant	Jubail	Synthetic Rubber	1,100,000,000	Project Announced
YANPET - Yanbu Ethylene Glycol 2 Plant Revamp	Yanbu	Ethylene Glycol	80,000,000	EPC ITB
Yansab - Yanbu Butadiene Project	Yanbu	Butadiene	100,000,000	EPC ITB



من خلال التحول الرقمي - على تعزيز سلامتنا ووضع العنصر التنويعي في الاعتبار عند تطبيق السلامة السلوكية، وفهم سلوك الأشخاص والنتيجة النهائية. وذلك لأن نسبة 90 في المائة من جميع الحوادث ناجمة عن أخطاء بشرية، بما في ذلك الفشل في العمليات وصور الأنظمة. وفي هذا الصدد، تستخدم شركة أدنوك العديد من التقنيات لدعم الصحة والسلامة، ويرى المغربي إمكانية زيادة استخدام برامج تدريب الواقع المعزز في المستقبل. «نحن نستخدم الكثير من الكاميرات وأجهزة الاستشعار لمراقبة المحطات، وأصبحنا الآن نستخدم الكاميرات وتقنيات الرؤية الحاسوبية لتتبع بعض المفاهيم حول كيفية التنبيه بالسلوكيات، وذلك من أجل الأمان والصحة والسلامة والبيئة». وأشار المغربي إلى أن هناك تطبيقاً مطوراً، وهو استخدام سلسلة الكتل في الحاسبة الهيدروكربونية ولتسريع إجراء المعاملات، مشيراً إلى أن شركة أدنوك تتبادل المنتجات يومياً وباستمرار.

«سأز الناس الآن يعرفون تماماً كمية المنتجات التي تنتقل من شركة إلى أخرى، في الوقت الحالي، ولا توجد حاجة للتحقق من ذلك لأنها موجودة بالفعل على سلسلة الكتل». ويخلص هذا كله، بحق لنا أن نتساءل عن القدرات والإمكانات المثيرة؛ مثل «هل يمكننا تعقب وحدة من المواد الهيدروكربونية من رأس البئر إلى العميل النهائي؟ هل يمكننا أن نعلمها بنسبة كربونية معينة، ونؤكد من تطبيق معايير الصحة والسلامة والبيئة عليها، بل ونتحقق من جودتها؟ وهذا لا يبدو كونه مجرد بداية، فهناك العديد من الأفكار الجديدة التي تولد لدى الناس عند مفاهيم إلى مركز «بانوراما» لتتصرف على كيفية عمله. «إن التحول الرقمي هو عملية مستمرة، ولا يزال الطريق طويلاً والرحلة ممتدة، ولا نهاية لتحسين الكفاءة أو المستوى، فهناك دائماً إمكانية لتقديم المزيد والمزيد». وفي ختام كلمته، أضاف المغربي: «أدى إنشائها مركز «بانوراما» إلى نقل الشركة إلى مكانة غير مسبوقة، ونحن الآن في طريقنا لاكتشاف مبادئ جديدة. إذ تعد شركة أدنوك منافسة للتكنولوجيا والتقدم في الإمارات العربية المتحدة، وهي المكانة التي لا ندرج جهوداً في الحفاظ عليها».



محمد ناصر المغربي

لمناسب إلى الشخص المناسب لدعم قراراته وإجراءاته». وأردف: «نستخدم البيانات والتعلم الآلي لرفع مستوى الإنتاج وتحسين الكفاءة ولتجنب المخاطر التي قد تواجه المشاريع التي تبلغ تكلفتها مليارات الدولارات والقضاء على مثل هذه المخاطر».

وعن بين المجالات التي شهدت التأثير الأكبر هو الصيانة التنبؤية، حيث تمتلك شركة أدنوك واحدة من أكبر منصات الصيانة التنبؤية على مستوى العالم. وأضاف المغربي: «لدينا أكثر من 10 ملايين علامة أو جهاز استشعار حول منشآتنا». ومن ثم، فإنه من المقرر أن تستقبل منصة الصيانة التنبؤية أكثر من 700 جهاز تشغيل.

#### التركيز على الصحة والسلامة والبيئة

أولت شركة أدنوك اهتماماً بقضايا الأمن والسلامة والبيئة. إذ يؤكد المغربي دوماً على أن «الصحة والسلامة والبيئة جزء لا يتجزأ من سياسة الشركة. فقد شهدنا تحولاً من السلامة الشخصية إلى سلامة العمليات ثم إلى الوعي البيئي العام. وظلت شركة أدنوك تمر بمرحلة تحول منتظمة من خلال تنفيذ نظام إدارة الصحة والسلامة والبيئة، لذلك، فإننا نركز -

الأمر بالغ الأهمية، نظراً لأن الجيل الرابع، في صناعة النفط والغاز، لا يتركز حول التكنولوجيا فقط، بل يتركز أيضاً حول الأشخاص أنفسهم».

وقال المغربي: «يتعلق الأمر بكيفية تبني التكنولوجيا، وكيفية الخراط الموظفين في مسيرة التحول، ولتبي هذه التكنولوجيا واستخدامها والثقة بها والعمل معها. فالأمر يتجاوز حول استغلال الميزات التي جادت التكنولوجيا بها لحل مشكلاتنا، واصطحاب موظفينا معها. بدأ بيد - لاتخاذ نفس هذا المسار». وبمناقشة كيفية تحويل عمليات شركة أدنوك، حرص المغربي على التأكيد على أن الرقمنة ليست غاية في حد ذاتها، بل هي جزء لا يتجزأ من استراتيجية أعمال شركة أدنوك.

«إن تبني التكنولوجيا يعني تغير منهجية عملك، فلماذا نغير منهجية عملنا، فلماذا لن نستفيد من هذه التكنولوجيا، أو نجعلها تؤثر على سائر الأرباح، ناهيك عن أنه لن يكون بمقدورنا التحكم في أسعار النفط أو مجريات السوق، وبشكل متسلسل مقصراً على التكاليف والكفاءة وسهولة العمل وتلبية الأعمال. ومن هذا المنطلق، تساعدنا التكنولوجيا الرقمية على فعل ذلك كله، كجزء من استراتيجية الأعمال الشاملة التي تتبعها شركة أدنوك. فالتكنولوجيا الرقمية ليست استراتيجية مستقلة داخل شركة أدنوك، فهي تتناسب مع منهجية عمل الشركة تحت راية تصورات الإمارات العربية المتحدة، ورؤى الشركة نفسها، واستراتيجيتها للسنوات المقبلة أو نحو ذلك. «لقد بدأت الرحلة للتو، حيث كان الجزء الأول منها متبطلاً في جمع كل المعلومات في مربع واحد ووضع تصور لها. وهو أمر بالغ الأهمية، إذ أنه أدى إلى إحداث تحول نموذجي في فهم عملية تدفق المعلومات داخل شركة أدنوك. لتبدأ بعدها مباشرة مرحلة وضع نهاية للعمليات التجارية، وصحة الآن تعمل في بيئة جماعية أكثر تعاونية، بدلاً من العمل بتدرج على نحو مُنقطع. الأمر الذي من شأنه أن يؤدي إلى تسريع سير منظومة العمل». «ندعم الأعمال على النحو الذي يؤدي إلى اتخاذ قرارات سليمة، ودعمها بالمعلومات والتكنولوجيا. فنحن نرى التكنولوجيا الرقمية والتكامل الاصطناعي يساعدان على إيجاد عمالة للمستقبل، مما يسمح بتقديم المعلومات في الوقت

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مركز جاهوداء الرقمي المتحكم

## رحلة التحول الرقمي لأدنوك

«السعي يشغف للارتقاء إلى مكانة غير مسبوقة». يلخص - براءة - شعار ستار تريك - رحلة التحول الرقمي لشركة بترول أبوظبي الوطنية (أدنوك)، والتي يمثل المركز المستقبلي للإدارة الرقمية للبيانات «بانوراما»، حجر الزاوية فيها. فقلما يتوأت الإمارات العربية المتحدة مكانة الريادة في تسخير تقنيات الثورة الصناعية الرابعة. ولم يسبق لأحد اغتنام الفرص التي توفرها الثورة الصناعية الرابعة بحماس يفوق شركة أدنوك، التي نجحت في جلب أحدث تقنيات الجيل الرابع إلى قطاع النفط والغاز لتدمج بينهما في مفهوم أطلقت عليه الجيل الرابع في صناعة النفط والغاز.

والبروكيماويات، والملتصقات المكررة، والكوادر البشرية العاملة في مقراتها، بما في ذلك كم الإنتاج النشط المستخرج. ليس فقط في مرافق التنقيب في الإمارات العربية المتحدة، بل وأيضاً في الهند واليابان. إن القدرة على وضع تصور لكل ما يوجد بالموقع مع إتسكان من معرفة ما يحدث في كل مكان في الوقت الحقيقي، باستخدام تحليلات البيانات والذكاء الاصطناعي للتنبؤ بماهية «الانحرافات المحتملة»، هو الأمر الذي أدى إلى إحداث تحول بمنظومة أدنوك ككل، وفتح آفاقاً جديدة لا حصر لها. «لقد انتقلنا إلى مرحلة جديدة برؤية منسقة تماماً. إذ أصبحت البيانات الآن متاحة للجميع في الوقت الحقيقي، حتى أنه صار بإمكانهم الوصول إليها من خلال هواتفهم الجوّالة أيضاً. وصار إنتاج سائل بومبا أحد أكثر حلول النفط الناتجة في الصحراء، مرئياً الآن، كما صارت أنشطة إشعال المحرّفات برتبية، وكذلك استهلاك الطاقة، ومؤتمرات الأداء الرئيسية».

وأضاف المغربي: «تكنن أهمية هذا التصور فيما يتسم به من وضوح وشفافية، إذ أنهما يمثلان محور التحول الثقافي الذي نلتحق إليه، والذي يتضح لنا من خلاله كل شيء». فقد أثمر بالفعل عن تحول نموذجي في ثقافتنا وتحولنا الرقمي».

جدير بالذكر أنه كان لهذا التصور أيضاً تأثيراً في إشراك إدارة شركة أدنوك والأشخاص الذين ساهموا في ترجمة رحلة التحول الرقمي على أرض الواقع. كما أنشأ المغربي أنه يحظر خروج فريق شركة أدنوك والبرتلين أيضاً بأفكار جديدة للمركز. وهذا

التكامل مع تطبيقات نظام تخطيط موارد الشركة والأنشطة التجارية وتكنولوجيا المعلومات، بل والخروج برؤى قابلة للتنبؤ. إذ يضح حل إدارة سلسلة التوريد الموحدة التي تقدمه «أهيفاء»، الاستفادة المثل من مستوى سلسلة القيمة بأكملها، وذلك بهدف تحسين التعاون والكفاءة والربحية، فيما يُمكن من حل تحليلات الأصول التنبؤية على تمكين الفريق من تقليل فترات التوقف عن العمل المفاجئة ومنع حدوث أعطال مكلفة بالمعدات.

### التحول النموذجي

أشار المغربي إلى أن القدرة الإنتاجية للشركة تُعادل ثلاثة ملايين برميل يومياً من النفط و9.8 مليار قدم مكعب في الثانية من الغاز يومياً، كما تضم مجموعة من 14 شركة متكاملة تعمل في مختلف مراحل سلسلة القيمة الهيدروكربونية.

وتابع قائلا: «إن عمليات شركة أدنوك، عبر سلسلة القيمة الكاملة، واسعة ومتنوعة، ومن ثم، يوفر لنا مركز الإدارة الرقمية للبيانات «بانوراما» وصلاً موحداً للبيانات الآلية عبر جميع العمليات ووحدة الأعمال، كما سمح لتطبيق النمذجة والمحاكاة والتحليلات لشركة أدنوك، بزيادة كمات الإنتاج في جميع المجالات». ونوه إلى أنه تم نقل أكثر من 200,000 نقطة بيانات إلى الموقع. وقال: «للمرة الأولى في تاريخها، يمتلك شركة أدنوك نظيراً كاملاً عن إنتاجها من النفط والغاز

في معرض حديثه في مؤامر القمة العالمي «أهيفاء» المنعقد في ستامبول في سبتمبر/أيلول حول قصة التحول الرقمي لشركة أدنوك، وصف عبد الناصر المغربي، نائب الرئيس لأعمال الرقمية بشركة أدنوك، كيف تستخدم الشركة تقنيات البيانات الضخمة، والذكاء الاصطناعي، وإنترنت الأشياء الصناعي، والمحاكاة الافتراضية المتقدمة، للمساعدة في تحقيق الاستفادة القصوى من أصولها ومواردها وتحقيق أهدافها التجارية والتشغيلية. وفي سياق متصل، أوضح المغربي أن التحول الرقمي الذي حدث لشركة أدنوك، كان بقيادة معالي الدكتور سلطان أحمد الجابر، المدير التنفيذي وصاحب هذه الرؤية. فقد كانت بوابة التحول الرقمي للشركة، مركز الإدارة الرقمية للبيانات «بانوراما»، والذي يمثل إحدى بنات أفكاره في إطار سعيه للوصول إلى «منسقة واحدة من الحقيقة».

وإستناداً إلى تقنية شركة «أهيفاء» يُعتبر «بانوراما» مركزاً موحداً للعمليات يضم حوالي 200 لوحة معلومات يتوافر بها بيانات موحدة في الوقت الحقيقي عبر سلسلة القيمة الكاملة لشركة أدنوك لتكون متاحة على منصة واحدة، والتي يتم توليدها وتحليلها ودمجها في عملية صنع القرار، حتى تتمكن شركة أدنوك من تكوين نظرة شاملة وعدم تقيد الكفاءات وتحديد مسارات جديدة لتحسين الأداء.

ويستخدم مركز بانوراما منصة نظام «أهيفاء» وواجهة إدارة عمليات منصة «إن تاتش» كأساس للعرض المعلوماتي، مما يتيح





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تحليلات

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استطلاعات: التدريب والتطوير

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