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Oil · Gas · Petrochemicals

Middle East

VOLUME 25 | ISSUE 1 2022

- Egypt progresses its energy hub ambitions
- Decarbonising ammonia production
- Remote operations for efficiency gains
- Advancing well intervention
- Oil market outlook

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VOLUME 25 | **ISSUE 1 2022**

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- Decarbonising ammonia production
- Remote operations for efficiency gains
- Advancing well intervention
- Oil market outlook

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Editor's note

HOW THE TABLES have turned! At the time of writing, oil prices are at a seven-year high, primarily driven by tensions and uncertainty in the Middle East and Eastern Europe. How will the oil markets play out this year? Our article on p14 examines all the upside and downside risks, concluding that robust demand and tighter supply could make oil an expensive commodity.

Meanwhile, the drive for cleaner energy continues unabated in the drive for net zero emissions. The latest clean energy technologies were showcased at the World Future Energy Summit, which highlighted in particular the critical role hydrogen is set to play in the energy transition (p24).

Our feature on Egypt examines developments in the country's buoyant oil and gas sector, as the country advances its energy hub ambitions (p18). We also assess prospects for the tanker market (p39) and progress being made in Aramco's localisation objectives (p30). While our technology section looks at the benefits of remote operations centres (p36) and collaboration to reduce data barriers (p34).

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Front cover image: Adobe Stock
Back cover image: Aramco

➔Executives' Calendar, 2022

FEBRUARY			
14-16	**Egyps**	CAIRO	www.egyps.com
21-23	**Int'l Petroleum Technology Conference**	DHAHRAN	www.iptcnet.org
22-24	**International Energy Week**	LONDON	www.ieweek.co.uk
MARCH			
7-9	**Middle East Energy**	DUBAI	www.middleeast-energy.com
16-17	**MENA HSE Forum**	DUBAI	www.hse-forum.com/mena
21-23	**Oman Petroleum & Energy Show**	MUSCAT	www.omanpetroleumandenergyshow.com
28-29	**Offshore Well Intervention Middle East**	ABU DHABI	www.offsnet.com
MAY			
2-5	**Offshore Technology Conference (OTC)**	HOUSTON	https://2022.otcnet.org
10-12	**Med Energy Conference & Exhibition (OMC)**	RAVENNA	www.omc.it
10-12	**ME-TECH 2022**	DUBAI	www.europetro.com/event/380
31-2 June	**GDA Int'l Downstream Conference & Exhibition**	MANAMA	www.gdaconference.org
SEPTEMBER			
5-8	**Gastech**	MILAN	www.gastechevent.com

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

Debating the challenges and opportunities of the energy transition

CONVENED BY the Energy Institute's sector experts, International Energy Week, which takes place from 22-24 February as a hybrid event, is the global conference for a new energy era.

It builds on the renowned legacies and strengths of IP Week, which has featured the highest calibre speakers from across oil, gas, and the wider world of energy, thought leadership on the defining issues, and dynamic networking opportunities.

As the climate crisis continues to transform societies' expectations, International Energy Week 2022 will assess the outcomes of COP26 alongside the continuing recovery of the COVID-19 pandemic.

Oil and gas industry leaders will be joined by senior officials and influencers from the wider energy world, as well as government representatives, environmental NGOs, and scientists and academics, to assess the technologies, business models, and skills needed for a net zero future.

Conferences and round-table discussions provide a platform where delegates can debate key issues, share new ideas and insights, and network to form new partnerships.

With more than two days of virtual engagement and one day of face-to-face conferences held at the InterContinental London Park Lane and broadcast online, International Energy Week is essential for those leading on corporate strategy, business development and technological innovation – anyone seeking to retain a competitive edge as the global energy transition accelerates.

Image Credit: Adobe Stock

The event will discuss the technologies, business models and skills needed for a net-zero future.

Speakers include Patrick Pouyanné, chairman and CEO, TotalEnergies; Claudio Descalzi, CEO, Eni; The Rt Hon Patricia Scotland QC, Secretary General, Commonwealth; The Rt Hon Kwasi Kwarteng MP, Secretary of State, Department for Business, Energy & Industrial Strategy; Dr Mele Kolo Kyari FEI, group managing director/CEO, NNPC Limited (Nigerian National Petroleum Corporation); Sara Akbar, CEO and chairperson, OILSERV Kuwait JV, and PETROFAC board member; Martin O'Neill, vice president, Strategy, GE Gas Power; and Alexandra Hirst, vice president for People and Organisation, Equinor.

For further information, see the website at www.ieweek.co.uk.

IPTC 2022 – Fuelling global recovery through sustainable energy

HELD UNDER THE patronage of HRH Prince Mohammed bin Salman Bin Abdulaziz Al-Saud, Crown Prince, Deputy Prime Minister and Minister of Defense of the Kingdom of Saudi Arabia, the International Petroleum Technology Conference (IPTC) 2022 will be held from 21-23 February at the Riyadh International Convention and Exhibition Centre in Riyadh, Kingdom of Saudi Arabia, with Saudi Aramco serving as host.

IPTC is a collaborative effort among 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). It 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.

Regional energy ministers, industry leaders, and governmental representatives will have an opportunity to discuss and share their views on timely industry topics and trends, exchange expertise and experience, present state-of-the-art technology and innovation, and to stimulate further research of technical and business activities. In addition, awards and recognition will be given for organisations' efforts in technical and business contributions to the industry. There will also be a range of integrated social activities to encourage networking and off-line discussion.

Nasir K. Al-Naimi , IPTC 2022 executive committee chair and senior vice president, Upstream, Saudi Aramco, said, "With the theme of 'Fuelling Global Recovery through Sustainable Energy,' IPTC 2022 will showcase upstream sector resilience, technological advancement, and ecosystem evolution during these critical times. Over 18,000 participants from around the world are expected to benefit from a world-class conference programme, field trips, and state-of-art exhibitions exploring emerging technologies and applications.

"In addition to the many experts in attendance, IPTC provides numerous learning opportunities for students, and strongly encourages the participation and development of our talented young professionals.

Image Credit: Aramco

Nasir K. Al-Naimi, IPTC 2022 executive committee chair and senior vice president Upstream, Saudi Aramco.

"It is my pleasure to invite you to join us as we bring together global thought leaders, technologists, and strategists to share their views on how innovation and collaboration will shape our role in a circular carbon economy, and pave the way for sustainability, economic growth, and prosperity for generations to come."

For further information, see the website at https://2022.iptcnet.org

Middle East Energy returns as live event

Middle East Energy is set to return as a live, in-person event in Dubai, guiding the region through the global energy transition.

MIDDLE EAST ENERGY 2022, formerly known as Middle East Electricity, is set to open its doors once again for its 47th edition.

Hosting more than 800 international exhibitors such as Perkins, Baudouin, Newage Stamford AVK, Riello UPS, Cummins to name a few, Middle East Energy 2022 brings you a unique experience with alternative energy suppliers and professionals from across the sector to showcase the latest in energy products and solutions while discussing the future of energy in emerging markets.

Held under the patronage of H.H. Sheikh Maktoum Bin Mohammed Bin Rashid Al Maktoum, Deputy Ruler of Dubai, and hosted by the UAE Ministry of Energy & infrastructure, the three-day event will take place from 7-9 March 2022 at the Dubai World Trade Centre, with the online platform open from 11 January-31 March.

Five product sectors

Keeping in line with an evolving need for a diverse, digitised and sustainable future, the event will feature FIVE specific product sectors – smart solutions, renewable and clean energy, transmission and distribution, energy consumption and management; and critical & backup power.

Visitors and exhibitors will have the chance to network with government officials, experts from the utility sector, contractors, distributors, manufacturers, energy consultants and project financiers; build long-lasting business relationships; and gain new perspectives on the energy industry.

> “The forum has been developed around the central pillars within the energy transition.”

Middle East Energy will also be supported by the Global Energy & Utilities Forum, which provides a foundation to the core messaging of Middle East Energy by bringing together industry experts and providing them with a platform for thought leadership, collaboration, and solutions for meeting this drastic shift within the global energy sector.

Delivered through high-level strategic panels, technical sessions, roundtable discussions and workshops, the forum has been developed around the central pillars within the energy transition, featuring key themes such as decarbonisation, finance and investment, digitalisation, technologies, and more.

Long-established show

Middle East Energy enjoys a legacy of more than 45 years, and has established itself as one of the largest gatherings of energy organisations, showcasing innovative products and solutions that help facilitate the region’s commitment to reducing its power generation carbon footprint. ■

To register for the event please click on the following link: https://bit.ly/3qcHl7G

The event is set to host more than 800 international exhibitors.

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Heerema wins contract for Marjan Program

HEEREMA, A MARINE contractor company based in the Netherlands has announced it has been awarded a contract by McDermott to transport and install six large jackets within Package-1 of Saudi Aramco's Marjan Increment Program.

"The award of the Marjan jacket scope is evidence of McDermott's confidence in Heerema's capabilities to deliver large transport and installation scopes in the Middle East. We are looking forward to returning to the region in 2023 for a collaborative and successful campaign," said Michel Hendriks, Heerema's transport and installation director.

Image credit: Heerema

The project is said to be running from Heerema's Leiden Offices and the soon-to-be-established Al Khobar office.

Heerema's contract includes the transportation and installation of six jackets, piles and boat landings, which make up part of the GOSP complex. The company will also transport the jackets from the L&T yard in Oman to the Marjan offshore field using the company's H-591 barge. The installation vessel will be Heerema's largest semi-submersible crane vessel Sleipnir, which runs on emission-reducing LNG and has a lifting capacity of 20,000 mt.

Upstream M&A deals reach record level

GLOBAL UPSTREAM merger and acquisition (M&A) deals rebounded to pre-Covid-19 levels in 2021, reaching a total of US$181bn, a 70% increase over 2020, according to Rystad Energy research. The total deal value for 2021 was the highest in three years and almost reached the highs seen in 2017 and 2018 of US$205bn and US$199bn, respectively.

Rystad Energy stated that the deal pipeline is robust, and the upstream M&A market looks set to continue to strengthen, with deals in the US likely to remain a crucial driver of the global deal value. Large sales in other regions may also materialise in 2022, particularly if majors continue to streamline their portfolios.

"With a strong potential deal pipeline, continuous pressure on companies to transform amid a global push to lower carbon emissions while simultaneously delivering profitable oil and gas production, and an average oil price of above $60 per barrel expected for 2022, the upstream M&A market is likely to stay active for the foreseeable future," opined Ilka Haarmann, senior analyst at Rystad Energy.

ICIS partners with Carbon Minds to achieve sustainable supply chains

ICIS, A GLOBAL independent commodity intelligence service provider and Carbon Minds, an innovative environmental impact specialist working in the chemicals sector, have partnered to provide companies in the chemicals supply chain with data to support decision making on the net-zero transition.

According to ICIS, the new partnership will widen access to independent, supplier-specific, carbon emissions data, enabling companies to instantly identify emissions hotspots, identify opportunities for reduction, compare suppliers and measurement of their Scope 3 chemicals carbon footprint.

Image credit: Adobe Stock

The data for supplier-specific carbon footprints covers 77 bulk chemicals that are consumed to produce a wide variety of materials used in around 96% of manufactured goods said ICIS.

Arne Kätelhön, managing director and co-founder at Carbon Minds, explained, "As a planet, we have to reduce our carbon emissions and, although companies are setting climate targets for their products, they need greater visibility into the supply chain to truly achieve this. Partnering with ICIS, together we make supplier-specific emissions data more accessible and help businesses fully understand the emissions that are being added to their products through the supply chain."

Louise Boddy, head of commercial strategy – sustainability at ICIS, said, "Our focus on sustainability ensures we support our customers and markets in their plans to lower emissions. This is becoming increasingly critical for access to capital, and we recognise how crucial and challenging it is to measure and lower the negative impact of supply chains."

Wood propels Middle East growth with US$580mn of wins in 2021

WOOD HAS MARKED a year of strategic growth in the Middle East region following a suite of contract awards and strategic framework renewals across its consulting, projects and operations business units, accumulating in US$580mn of secured backlog in 2021.

As operators focus on economic recovery from the pandemic and ensuring continued energy supply, Wood aims to deliver solutions to optimise energy production, reduce carbon impact and accelerate the energy transition across the region, strengthening its position as a trusted partner to enable reliable and sustainable energy production in the face of rising demand.

The contracts awarded in 2021 will see Wood's teams across the Middle East work together with a range of valued partners and clients to unlock conventional and low carbon energy supply, optimise energy production and processing, and extend onshore and offshore asset life in Bahrain, Iraq, Saudi Arabia, Kuwait, Qatar and the UAE.

Image credit: Adobe Stock

Awards in 2021 include a multi-million dollar contract with Saudi Aramco to deliver engineering and project management services for the Safaniyah and Manifa oilfields.

Craig Shanaghey, Wood's president of operations across Europe, the Middle East and Africa, said, "The global pandemic has brought many challenges and it is encouraging to see how the energy industry in the region is not only recovering but also thriving, as it takes a leading role in the quest for a more balanced, integrated and lower-carbon energy mix."

Jim Shaughnessy, Wood's president of Conventional Energy Projects, continued, "Leveraging our foothold across the Middle East, we are looking to 2022 and beyond from a position of strength, ready to support the region on its journey to becoming a global leader through the energy transition."

Westwood: 2021 offshore investment bounces back to pre-pandemic levels

AN ANALYSIS FROM Westwood Global Energy Group (Westwood), the specialist energy market research and consultancy firm, has revealed a year-on-year growth for the global offshore rig market at the close of 2021, up 200% from 2020.

This has been bolstered by significant engineering, procurement and construction (EPC) spend, closing last year at US$41.7bn, close to 2019 levels.

Further analysis shows that global rig contract fixtures, including options exercised, totalled 142 in Q4 2021, representing 54,829 rig days, a 155% increase compared to the previous quarter, adding some much-needed optimism following a period of turbulence.

Alex Middleton, senior market analyst at Westwood, said, "Several major drilling regions, including North America, South America and the Middle East have experienced minimal fall out. In fact, South America has fared particularly well, ending last year in better shape than before the pandemic. Brazil remained particularly buoyant, with high EPC spend coupled with no instances of contract cancellations resulting in continued drilling throughout the period."

As seen in Figure 1, annual EPC spend 2022-25 is anticipated to average US$57bn per year. The year 2022 is estimated to hit more than US$70bn in EPC spend, the highest since 2013. High profile projects such as Saudi Aramco's North Dome and QatarEnergy's North fields in the Middle East, Petrobras' Buzios, BHP's Perdido and ExxonMobil's Yellowtail projects in Latin America, Equinor's Wisting and Aker BP/Equinor's NOAKA projects in the North Sea, and PetroVietnam's Block B project in Southeast Asia, have an anticipated combined spend of US$29bn (40% of total spend).

Global jackup fleet utilisation showed a small but steady climb throughout 2021, from 76% marketed utilisation in the first quarter to 81% in the final quarter of 2021. Global semi utilisation had rebounded until the last few months of 2021. Despite a sharp supply reduction since early 2020, semi demand also fell, finishing the year at 64% marketed utilisation, much lower than that of the drillship fleet. Contracted utilisation for the marketed drillship fleet averaged 75% in 4Q 2021, representing a near 10% increase compared to the same period last year.

New rig deliveries remain dormant, and the attrition rate has room for improvement. Attrition in 2021 was at its lowest level since 2014, with just 33 rigs removed from the fleet, far below the 46 units taken out of service in 2020. With 66 cold stacked jackups still in the fleet, plenty of retirement candidates remain.

What is evident from 2021 is that several major drilling regions appear to have weathered the Covid storm with little fallout, while other markets suffered more significantly. Drilling demand in North America, South America and the Middle East has remained strong since 2019 and they exited 2021 in good shape, and in the case of South America, in even better shape.

Offshore drilling in the North Sea, Africa and Southeast Asia has taken a knock, with demand on a downward trajectory since the start of 2020 and hitting rock bottom at the close of 2020. These regions have been on the road to recovery in 2021, although there is still a way to go for Africa. The North Sea and Southeast Asian rig markets look to be back at pre-pandemic levels of rig demand.

The new Westwood analysis accompanies the launch of Westwood's Global Offshore Rig Market report and new RigLogix Advanced tool, an optional extension to its existing RigLogix solution, a leading source of offshore rig intelligence used by leading E&P companies, rig contractors, OFS companies and financial sector advisers worldwide.

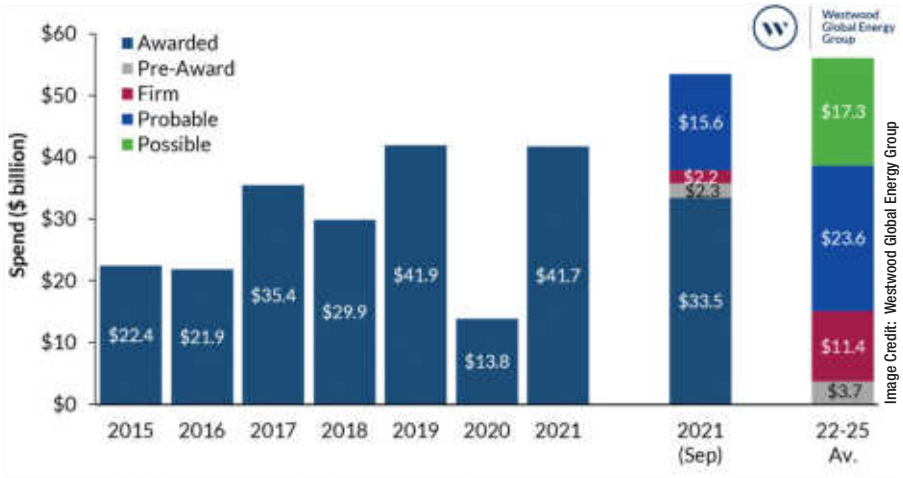

Figure 1: Offshore upstream EPC spend.

Wood and FutureOn to provide an integrated digital service to operators

FUTUREON, THE GLOBAL software company specialising in the energy sector, has formed a strategic collaboration with global consulting and engineering leader Wood, to provide an enhanced service to its client base of global asset operators.

Wood's expert technical services specialising in the early field development studies for subsea and ocean-based energy systems, will integrate with FutureOn's unique field design applications, and proven API-centric collaboration platforms, resulting in significant efficiency gains across the design phase.

Having previously trialled FutureOn's technology in 2019, the latest agreement will see Wood provide technical and integration services to operators using FutureOn's software. In addition, the company will offer the software as part of its suite of technical services to new and existing customers across the world.

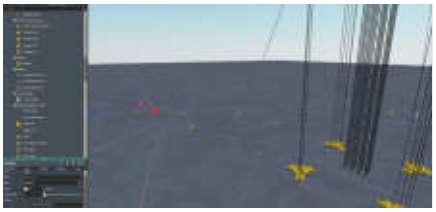

Image credit: Wood

The companies aim to build a sustainable economic recovery from their existing infrastructure.

FutureOn's open and collaborative approach to field design is based on data-rich 2D and 3D visualisations. The inclusion of metadata on assets and costs will enable reliable early-stage production and financial forecasts.

Aramco signs multiple agreements during the Saudi-Korean investment forum

THE SAUDI ARABIAN Oil Company announced the signing of one agreement and nine Memoranda of Understanding (MoUs) with leading Korean entities, in an aim to advance its downstream strategy and support development of low-carbon energy solutions, while creating new financing options for the company.

The signings took place at the Saudi-Korean Investment Forum in Riyadh, an event hosted by Saudi Arabia's Ministry of investment which was attended by the President of the Republic of Korea, HE Moon Jae-in, Aramco president and CEO Amin H. Nasser and senior corporate executives from both countries.

Aramco has signed a deal with Korea's Doosan Heavy Industries & Construction Company and the Saudi Arabian Industrial Investments Company, Dussur. The partnership aims to establish a casting and forging facility that could supply the kingdom's manufacturers with industrial and process equipment such as valves, pumps, compressors, wellheads, flanges, heat exchangers and gas and wind turbines with the objective to enhance local content.

IoT is the backbone of oil and gas digitalisation: GlobalData

OIL AND GAS (O&G) companies can no longer afford to ignore digitalisation, and any O&G company that doesn't start to modernise now risks going under, according to GlobalData.

The leading data and analytics company highlights Internet of Things (IoT) technologies such as digital twins have the potential to be the backbone of digitalisation in the energy sector.

Charlotte Newton, thematic analyst at GlobalData, commented, "On a rocky sea of fluctuating oil prices, expanding sources of supply, and increasing regulatory requirements, digitising operations and infrastructure can act as a life raft to energy companies in this age of uncertainty. Technologies such as IoT – the ability of everyday physical objects (such as fridges, watches or cars) to connect with other devices over the internet can help them mitigate the impact of these challenges.

"It may seem like a significant investment in the short term, at a time when most companies in the energy sector are stripping back capex and opex. However, in the long run, investment in IoT will pay dividends."

Image credit: Adobe Stock

Technologies such as digital twins – digital representations of physical assets, systems, or processes – have great potential in this sector.

According to GlobalData, the global IoT revenue in the energy sector is expected to reach US$59bn by 2025, up from US$34bn in 2019.

Newton continued, "Introducing IoT into daily operations makes them more efficient. Connected devices drive more sophisticated use of other technologies, namely artificial intelligence (AI), in the automation process. It creates a tech ecosystem that eases the difficulties of working in remote, dangerous conditions and working with aging, precarious assets through cross-functional collaboration."

Wood Mackenzie: Oil demand faces downside risks

WOOD MACKENZIE, a Verisk business, has released its *Oil markets: five things to look for in 2022* report which discusses the uncertainties and issues impacting global demand, oil supply and refining markets this year

The shape and scope of viral outbreaks and governments' responses place downside risk on economic recovery and oil demand growth in 2022. Additionally, with the pace of inflation accelerating in Q4 last year, consumption could be further hindered bringing downside risk to both economic growth and personal mobility.

Vehicle electrification policy and pace of adoption during 2022 will have ramifications on global transport fuel demand in this decade and beyond. China's EV subsidy will be eliminated by the end of 2022, after an extension by two years as a response to the pandemic. Wood Mackenzie expects China's EV sales to continue growing strongly, from 6% in 2020 to 15% for 2021 and 19% for 2022.

Europe's "Fit for 55" proposed amendments to the Energy Taxation Directive, is removing tax exemptions on aviation and marine bunker fuels sold within, and for use within, the EEA from 2023 onwards. This does require unanimous approval among member states, so will be one to watch in 2022.

Non-OPEC is expected to contribute nearly half of the global oil supply growth with North America as the main contributor, with gains from Canada and the US including from the Gulf of Mexico. In contrast to 2021, US Lower 48 crude production is expected to show year-on-year growth. However, operators are still focused on paying down debt and returning funds to investors.

Elsewhere, the main sources of non-OPEC growth are Russia, Brazil, which should deliver after a disappointing 2021, and the North Sea, where strong gains in output are expected.

The OPEC+ agreement to increase production across the group by 400,000 bpd each month, until September 2022 is expected to continue. But the OPEC+ producers intend to meet each month to examine the fundamentals and adjust as needed if demand is different than expected.

WoodMac's vice-president Ann-Louise Hittle said, "Total OPEC crude oil production is forecast to rise 2mn bpd to 28.3mn bpd in 2022 compared to last year, and gains in Russia's oil production is also expected.

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ExxonMobil announces net zero ambition

EXXONMOBIL HAS ANNOUNCED its ambition to achieve net zero greenhouse gas emissions for operated assets by 2050, a proclamation which was contained in the company's Advancing Climate Solutions 2022 Progress Report.

The net zero aspiration applies to Scope 1 and Scope 2 greenhouse gas emissions and builds on the company's 2030 emission-reduction plans, which include net zero emissions for Permian Basin operations and ongoing investments in lower-emission solutions.

Darren Woods, chairman and chief executive officer of ExxonMobil, commented, "ExxonMobil is committed to playing a leading role in the energy transition, and advancing climate solutions articulates our deliberate approach to helping society reach a lower-emissions future.

Image Credit : Adobe Stock

ExxonMobil will help customers reduce their greenhouse emissions by investing in capture and storage, hydrogen and biofuels.

"We are developing comprehensive roadmaps to reduce greenhouse gas emissions from our operated assets around the world, and where we are not the operator, we are working with our partners to achieve similar emission-reduction results."

AD Ports Group creates logistics base at Mugharraq Port

AD PORTS GROUP has signed a new agreement with Eni Abu Dhabi B.V., the Abu Dhabi-based branch of the Italian Integrated Energy Company, to establish a marine logistics base at Mugharraq Port supporting offshore drilling operations in Al Dhafra region.

In addition to being provided a dedicated quay wall, marshalling yard, as well as manpower and logistical equipment, the company will also have access to liquid mud and bulk plant facilities onsite.

Saif Al Mazrouei, Head of Ports Cluster, AD Ports Group, said, "Utilising the industry-leading infrastructure and service capability that we have on offer at Mugharraq Port, Eni will be able to operate in proximity to its offshore drilling facilities benefiting operational efficiency."

Mubarak Al Mazrouei, Port Director – Al Dhafra Region, AD Ports Group, said,"With enhanced capabilities to serve the GCC's oil and gas market, as well as the recent recognition as an international port facility, Mugharraq Port is now well equipped to meet both the regional and global requirements of the Middle East's leading energy players."

TotalEnergies joins Masdar and Siemens Energy to drive green hydrogen development

MASDAR, SIEMENS ENERGY and TotalEnergies have signed a collaboration agreement on the sidelines of the Abu Dhabi Sustainability Week (ADSW) 2022, to act as co-developers for a demonstrator plant project, to be established at Masdar City, Abu Dhabi's flagship sustainable urban development.

Image Credit : Masdar

The collaboration was signed on the sidelines of Abu Dhabi Sustainability Week 2022.

Francois Good, senior vice president, Refining and Petrochemicals Africa Middle East and Asia at TotalEnergies, said, "In this project, TotalEnergies brings its expertise in renewables energy as well as SAF manufacturing and marketing advanced sustainable fuel production with the aim of acting directly on the carbon intensity of the energy products used by our customers."

Dietmar Siersdorfer, managing director, Middle East and UAE, Siemens Energy, said, "Green hydrogen has a vital role to play in the decarbonisation of many industries, with the aviation sector presenting an excellent opportunity."

Mohamed Jameel Al Ramahi, chief executive officer, Masdar, said, "While the hydrogen market is still at a comparatively early stage, we firmly believe that by working together with international partners on projects such as this, we can help the hydrogen market develop its full potential and it will really take off in the years to come."

Masdar announced ahead of ADSW 2021 last year that it was collaborating with Abu Dhabi Department of Energy, Etihad Airways, Lufthansa Group, Khalifa University of Science and Technology, Siemens Energy, and Marubeni Corporation on the demonstrator plant initiative. The aim now is that TotalEnergies will offer its expertise in SAF production, offtake and supply the partner airlines.

bp to help progress renewable energy in Oman

BP AND THE Ministry of Energy and Minerals in Oman have signed a strategic framework agreement (SFA) and a renewables data collection agreement to support the development of a multiple gigawatt, world-class renewable energy and green hydrogen drive in Oman, by 2030.

bp will capture and evaluate solar and wind data which will then support the Government of Oman in approving the future developments of renewable energy hubs at suitable locations. The renewable energy resources could also supply renewable power for the development of green hydrogen, targeting both domestic and global export markets.

Image Credit : bp

Under the SFA, bp and Oman will also consider ways to collaborate in a number of areas.

bp's chief executive, Bernard Looney, said, "Today's agreement represents what bp is able to offer as an integrated energy company. These projects will build on our gas business, and bring wind, solar and green hydrogen together in a distinctive and integrated way supporting Oman's low carbon energy goals.

"And we're not just investing in energy. We are investing in Oman to create and develop infrastructure, support local supply chains and cultivate the skills and talent needed to usher in this next generation of energy leaders. We look forward to working closely with the Omani government to take this forward."

His Excellency Dr Mohammed Al Rumhy, Minister of Energy & Minerals of the Sultanate of Oman, added, "This is a proud moment for Oman and a significant step towards delivering our 2040 Vision. In partnership with bp, we will progress the development of new, world-class solar and wind resources – generating renewable power for the grid and powering the manufacture of green hydrogen to supply domestic demand and to export to global customers."

Smarter policies needed for carbon capture to succeed: CEO of Crescent Petroleum

THE ENERGY SUPPLY crunch in Europe, Asia and the USA this past year has underscored the need for a smarter carbon transition policy, Majid Jafar, the CEO of Crescent Petroleum, told industry and policy leaders gathered for a virtual panel at Abu Dhabi Sustainability Week.

To make lasting progress, carbon transition policy must be tailored to each country's needs and dynamics while addressing the limitations of renewable energy such as intermittency and lack of storage.

"Any successful and sustainable policy must address the need for affordable and reliable energy in the developing world, where a billion people still don't have electricity and three billion have no clean cooking solutions," Jafar told attendees at the launch of the Atlantic Council Global Energy Agenda.

"What has become clear in recent months is that insufficient investment in oil and gas is leading to higher energy costs and more burning of coal worldwide, which both harms the economy and efforts to tackle climate change," he added.

Jafar was joined on the panel by Mele Kiyari, group managing director, Nigerian National Petroleum Corporation; Francisco La Camera, director general of the International Renewable Energy Agency (IRENA); Amb. Daniel Fried, former assistant secretary of state for Europe and distinguished fellow at the Atlantic Council; and Helima Croft, managing director and head of global commodity strategy at RBC Capital Markets.

Jafar highlighted that the price rises and energy shortages last year were the result of three simultaneous trends: low investment in oil and gas production and infrastructure, a rise in demand as economies recover from the pandemic, and the shutdown of some nuclear power sources. He stressed that while renewables are part of the solution to reducing carbon emissions, the continuing importance of oil and gas in ensuring stable energy supply and in enabling the transition cannot be ignored.

"Solar and wind power are promising but cannot be stored, so stable energy sources such as natural gas and nuclear power will be needed to complement them, as the UAE's wise policy has demonstrated," Jafar added.

Aggreko completes Middle East's largest flare gas-to-power project to date

Image Credit: Aggreko

Drone overview of the project.

AGGREKO, THE GLOBAL provider of mobile, modular power, temperature control and energy services, has commissioned the largest flare gas to power project in the Middle East to date at 165MW capacity.

The plant is situated nearby the Saqala Field, Garmain block, South East Kurdistan.

The 165MW modular power plant has run at full capacity for 72 hours in the project's final site acceptance test (SAT), marking successful on-time, on-budget delivery. The plant is run on approximately 40mn scf per day of associated petroleum gas (APG) from the Saqala Field, saving 840 tonnes of CO_2 per day, and cutting flaring by a third.

Delivered over the course of 2020-2021 against the backdrop of the pandemic, the project was conceived and executed in close collaboration with Iraqi Kurdistan's Ministry of National Resources (MNR) and Ministry of Electricity (MOE). Aggreko delivered a new six kilometre gathering pipeline to transport the APG to the power plant and upgraded seven kilometres of 33 kV and 33km of 132 kV overhead cables to new high tensile low sage (HTLS) conductors in order for the local distribution grid to handle the new power plant's full output.

Coretrax deploys ReLineWL technology in Middle East

CORETRAX'S RELINEWL expandable technology, which aims to unlock greater commercial value by maximising production from existing wells, has been deployed in the Middle East for the first time.

The global well integrity and production optimisation leader's ReLineWL is a one-trip, wireline deployed straddle system to address common well integrity issues, which delivers significant operational efficiencies for operators.

ReLineWL aims to deliver a 700% greater flow area when compared to traditional straddles, securing safety and sustainability benefits by reducing the number of onsite personnel required to complete the work.

Deployed to support a major Saudi operator, the expandable technology was brought in when water ingress on a producing well led to decreased oil recovery. Following detailed well analysis, two ReLineWL 28ft straddles were deployed on e-line, enabling the operator to isolate several perforation intervals to shut off water production zones.

Compared to traditional tools, the ReLineWL's outer diameter (OD) allowed the system to pass through restrictions before they were expanded and set at almost 7,000ft. The tool delivered a large post-expansion inner diameter, providing maximum production conduit to surface over conventional options.

Honeywell launches oil and gas production facility in Saudi Arabia

HONEYWELL HAS LAUNCHED a new production facility for oil and gas projects in Saudi Arabia.

The facility has been developed as part of a Joint Venture (JV) partnership (Elster Instromet Saudi Arabia) with Gas Arabian Services to provide a state-of-the-art infrastructure for manufacturing and assembly of natural gas and liquid fuel solutions.

A key part of the new facility is the use of Elster precision solutions, which include extensive, end-to-end technologies for gas and liquid metering, as well as control applications for the oil and gas industry. Through the facility, Honeywell will offer both skids and stations solutions, along with automation and control systems.

This launch builds on the agreements from the memorandum of understanding (MOU) signed between Honeywell and Saudi Aramco in May 2017, which included Honeywell undertaking commercial efforts to assist Saudi Aramco in achieving the goals of the In-Kingdom Total Value Add (IKTVA) Programme.

"Honeywell has been serving the Saudi Arabian market with instrumentation, control systems and advanced application solutions for many decades. The new facility will help drive knowledge transfer and support the creation of highly skilled roles," said George Bou Mitri, vice-president and general manager for Honeywell Performance Materials and Technologies in the Middle East.

Image Credit: Honeywell

George Bou Mitri .

A turning point for the crude oil market?

Moin Siddiqi, economist, assesses oil market prospects in the aftermath of the worst recession in the industry's history.

IN THE AFTERMATH of the worst-ever recession in the petroleum industry's history in 2020, oil prices staged a significant recovery last year on both demand and supply sides, thanks to the uptick in the global economy, the vaccination process that led to increased mobility, and an acute shortage of natural gas, which boosted the demand for crude as a substitute.

US investment bank J.P. Morgan anticipates strong underlying fundamentals sustaining above-potential global GDP growth this year and next, with pro-growth fiscal policies continuing to support the ongoing recovery. Crude prices gained nearly 60% in 2021, whilst global oil demand has already exceeded the threshold of 100mn bpd last seen before the pandemic, bp estimates. Therefore, 2022 could be the 'post-pandemic' year for the crude market, with demand rebounding to 100% of pre-Covid levels.

The tight physical market is reflected in 'backwardation' in oil futures, i.e., a sign that the supply glut is narrowing and near-term supply/demand conditions are tightening – hence upward pressures on future oil prices for both major benchmarks, Brent and West Texas Intermediate (WTI).

> "Monthly oil consumption is now near pre-2020 highs and set to rise further."

The upstream sector is poised for a modest rebound this year with exploration and production (E&P) investment expected at more than US$400bn (Wood Mackenzie). But reinvestment rates remain near record lows as companies maintain capital discipline, while increased focus on climate change and shareholders' pressure to decarbonise operations are hindering replacement of depleting world oil production and reserves through bringing new supplies online.

The switch towards carbon neutrality by many governments, along with environmental, social and governance issues, have led to persistent underinvestment in new oil fields, with greater emphasis on low-breakeven, low-carbon deepwater projects dominating greenfield final investment decisions (FIDs).

Table 1: Global oil demand and supply balance (mn bpd)

	2019	2020	Est. 2021	Proj. 2022
Total petroleum consumption (incl. liquid fuels)	101.23	91.81	96.90	100.52
of which: OECD 35 countries [1]	47.55	41.98	44.38	45.76
Non-OECD regions	53.68	49.84	52.52	54.76
Total production [2]	100.61	93.84	95.53	101.05
of which: Non-OPEC supply	65.98	63.14	63.93	66.77
Global balance (closing year-end)	0.62#	2.03*	1.37#	0.53*
OECD commercial inventories	2,879	3,025	2,694	2,809

[1] Organisation for Economic Cooperation & Development, representing industrial nations.
[2] Crude oil, lease condensate, shale oil, oil sands, natural gas liquids & biofuels.
* Inventory build; # Inventory draw.

Top-10 crude oil producers, 2021 (mn bpd): USA (11.16); Russia (10.78); Saudi Arabia (9.11); Canada (5.58); China (5.0); Iraq (4.06); Brazil (3.69); UAE (2.72): Kuwait (2.42); and Iran (2.39), representing 60% of world's production.

Source: EIA, Short-term Energy Outlook, January 2022

Supportive price factors

The world's most heavily traded commodity starts a new year with renewed optimism about demand, despite Covid uncertainties and Europe's energy crisis. Monthly oil consumption is now near pre-2020 highs and set to rise further, especially in emerging market and developing economies amid a tepid recovery in global supply. Upside trajectories for demand and prices include:

- OPEC+ group 'supply management policies' – after cutting production by around 10mn bpd in 2020 due to the worst health epidemic in over 100 years, OPEC+ is now adding 400,000 bpd to collective output quota/month until September 2022 when each country hits their baseline. There are doubts if producers can boost production sufficiently in coming months even at elevated prices. Underproduction by Nigeria, Angola and Russia – struggling to reach their quotas due to technical and operational problems – could also underpin the market this year.
- Some of the top producers (including Russia) are nearing the limit of their spare capacity (indicator of output flexibility). Only Saudi Arabia, Iraq, the UAE and Kuwait currently possess spare capacity, i.e., where additional output commences within 30 days and is sustained for at least 90 days, as defined by the U.S. Department of Energy. OPEC's spare capacity could potentially reach only 4mn bpd by Q4 2022, down from 9mn bpd in January 2021, according to the International Energy Agency (IEA).
- Saudi Aramco's chief executive Amin Nasser said that crude production capacity

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was dwindling globally, thus requiring more upstream investments. "The world will see its level of spare oil production capacity dwindle as jet fuel demand returns to pre- or near-pre-crisis levels," Aramco said. The rebound in global fuel demand and supply/demand imbalance could prompt a new super-cycle for hydrocarbons, said Igor Sechin, chief executive of Russian major Rosneft.

- Heightened geopolitical tensions can spill over into lower global oil supplies. Russia (second-largest crude producer) could potentially face U.S.-led sanctions on exports in the event of military actions in Ukraine. Likewise, worsening unrest in Kazakhstan (which produces 1.8mn bpd); ongoing instability plus an investment slump in Venezuela (where 2021 output plunged to 560,000 bpd); or worst-case scenario political disintegration of Libya, which would stop over 1mn bpd from Africa's largest holder of proved oil reserves, have the potential to disrupt oil supply.
- Meanwhile, global inventories fell substantially in 2021 (below 5-year average), indicating an under-supplied market and higher drawdowns. Consumption is likely to break records in 2022 and 2023 as government spending on economic recovery and the energy transition continues to support demand. "Shrinking global spare capacity underscores the need for increased investments to meet demand further down the road," commented the IEA.
- Record gas and coal prices since Q4 2021 in Europe and Asia have led the power sector and energy-intensive industries to switch from natural gas to crude – hence creating additional oil demand when the market is fundamentally tight.

Table 2: The outlook for the oil market driven by the global economy

(Annual % change)

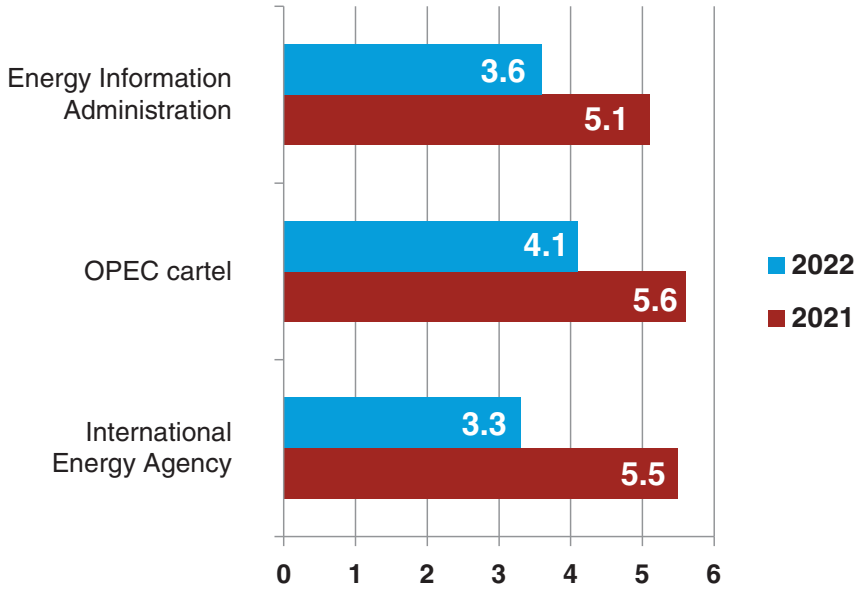
			Projections	
	2020	2021	2022	2023
Global GDP growth	-3.4	5.5	4.1	3.2
Advanced economies (average)	-4.6	5.0	3.8	2.3
of which: USA	-3.4	5.6	3.7	2.6
Euro Area	-6.4	5.2	4.2	2.1
Japan	-4.5	1.7	2.9	1.2
Emerging & developing economies (average)	-1.7	6.3	4.6	4.4
of which: China	2.2	8.0	5.1	5.3
India	-7.3	8.3	8.7	6.8
World trade volume of goods & non-factor services	-8.2	9.5	5.8	4.7

Source: World Bank Global Economic Prospects, January 2022

Note: Crude oil demand in 2021 rebounded from the pandemic-driven recession of 2020 and could set a new average annual record over the next two years as world output rises above pre-Covid levels.

> "The world is headed towards a supply shortage after 2025 unless the petroleum industry boosts investment in new projects."

The major forecasters of global oil demand growth (mn bpd)



Sources: Latest oil market reports published by above institutes

Note: Projections from the three major energy organisations remain optimistic about the pace of oil demand in 2022, with the total returning to slightly above pre-Covid levels, led mostly by non-OECD regions.

Top five oil-consuming economies, 2021 (mn bpd): USA (19.75); China (15.26); India (4.66); Russia (3.59); and Japan (3.33), according to EIA.

Downside risks

There are uncertainties overhanging the crude oil market, and by extension future price trends. These include:

- A return to widespread mobility restrictions if new Covid variants disrupt business activity and travel in more developed economies, at a time when fiscal and monetary stimulus polices are already or nearly exhausted. A weakening of economic growth due to global supply chain disruptions would slow energy demand.
- Emerging-market currency crisis in several oil-importing countries as the US dollar extends its rally. Oil priced in greenback becomes more expensive (in local currency) when the US dollar appreciates versus counterparts. This raises the possibility of a drop in oil consumption from a short-term price hike.
- The return of Iranian exports if Tehran and Washington strike a new nuclear deal, with Iran thereby re-joining the Joint Comprehensive Plan of Action (JCPOA), albeit a difficult negotiation process. Iran's 2021 output (2.4mn bpd) was down on the 2017 figure (3.79mn bpd). Higher Iranian supply alongside rising U.S. shale oil production would swing the balances into a sizeable surplus – thus prompting weaker prices in H2 2022.

Looming 'supply crunches'

Fossil fuels continue to play a pivotal role in

meeting around 85% of the global energy mix – the same level as in the 1980s. Peak oil demand is unlikely in the near future, and when it peaks, it will not plunge. OPEC sees global demand at 108mn bpd into the mid-2030s – thereafter set to plateau until 2045. Mohammad Barkindo, OPEC secretary-general has warned insufficient investment in new oil and gas supply would lead to energy shortages, as well as market imbalances and higher prices. Patrick Pouyanné, chief executive of TotalEnergies, echoed that oil prices would "rocket to the roof" by 2030 if the industry were to stop investments in new supply, as some scenarios for net-zero by 2050 suggest.

Even the IEA, champion of green energy, acknowledged in its World Energy Outlook 2021, "The world is not investing enough to meet its future energy needs, and uncertainties over policies and demand trajectories create a strong risk of a volatile period ahead for energy markets." Far more E&P investments are needed considering the 'long-lead' times in conventional projects from discovery to production. Spending on fossil fuels has fallen precipitously from 2014, reaching a bottom only in 2020. Estimates vary from between US$600bn to US$1 trillion of capital being lost to hydrocarbons extraction since 2014.

The world is headed towards a supply shortage after 2026 unless the petroleum industry boosts investment in new projects (Energy Intelligence Forum 2021). In the short-to medium-term, global oil supply should be adequate to meet demand, thanks to available OPEC spare capacity and supplies expected from already sanctioned new projects. However, post mid-2020s, the market will need either higher new supplies to meet growing demand, or lower consumption to avert the next supply shortage shock.

Image Credit: Adobe Stock

Robust demand and tighter supply could make oil an expensive commodity.

Higher for longer

Global annual upstream spending needs to rise to at least US$525bn through to 2030 in order to ensure security of supply (Saudi Arabia-based International Energy Forum and IHS Markit). E&P companies should increase their spending considerably over the medium term to fully replace reserves and avoid declines in future production, noted Moody's.

Six years ago, then bp chief executive Bob Dudley said, "The industry needs to prepare for lower for longer." By contrast, today's oil scenario is "higher for longer." Sustained chronic underinvestment and political pressure on energy majors to curb emissions and even keep recoverable reserves in the ground could result in petroleum supply peaking earlier than demand, thus structurally higher prices by mid-to-late 2020s.

The next two years are critical for the sanctioning of new projects to enable ample new supply to come online within five to six years. Oil remains a fundamental driver of energy security globally, regardless of the pace of the energy transition. A triple-digit oil price would undermine the stability of the global financial system and encourage investment in alternative energy. Therefore, achieving a 'fair price' that underpins a vibrant economic cycle lies in the best interest of both producers and consumers.

Without much-needed E&P investments, demand will continue to exceed supply – posing a threat to future energy security. However, banks are slowly cutting their exposure to the fossil fuel sector, reflecting pressure from shareholders, activists and governments. Meanwhile, supermajors are diverting capital to renewable energy projects as they focus on low-carbon businesses.

From a technical point of view, crude oil's high range could be US$75-85 and low range US$55-65. The market, vulnerable to headwinds, is incredibly hard to predict. That said, beyond 2022, robust demand and tighter supply (reflecting depleting global capacity to boost production) could make oil an expensive commodity. ■

Table 3: Upstream capital expenditure in new projects at multidecade lows

(US$bn)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
E&P spending	790	600	460	470	480	460	350	352	400
Brent (US$/bbl)	98.95	52.39	43.73	54.19	71.31	64.21	41.84	70.89	74.95

Sources: Wood Mackenzie, International Energy Forum, IHS Markit, S&P Global Platts & EIA

Note: Investment in new supply or oil extraction is lagging behind global oil demand growth.

Table 4: Global oil & gas discoveries at 75-year low in 2021

(bn bbl of oil equivalent)

	2015	2016	2017	2018	2019	2020	2021
Cumulative discoveries	20.3	7.9	12.1	9.9	15.8	12.5	4.7
Oil/liquid ratio	29.7	50.5	58.4	54.5	38.6	55.5	65.3

Source: Rystad Energy

Note: The low level of discoveries or recoverable reserves leads to a drop in reserve replacement ratio in the hydrocarbons industry. Both the IEA and OPEC have stressed the need for more new oil discoveries.

A number of significant offshore discoveries have been made in recent years.

Image Credit : Adobe Stock

Egypt progresses its regional energy hub ambitions

Egypt's extraordinary upstream successes of recent years means that it is now once again starting to refocus attention on export opportunities, says Martin Clark.

EGYPT'S RENAISSANCE AS a major global gas player continues in the wake of a series of significant offshore discoveries over the past few years. These reserves, from fields such as Zohr and Nooros, have provided the building blocks for the country to re-start gas exports, as well as help satisfy rising domestic demand. The Zohr field is believed to be the largest natural gas discovery ever to be made in the heart of the Mediterranean.

As a result, after a lull amid concerns over its dwindling reserves, Cairo is once again aggressively exploring energy exports to neighbouring countries. The North African country has once more regained its full capacity to meet domestic gas demand and can now allocate surplus production for export through its liquefied natural gas (LNG) plants and various pipeline initiatives. That includes the recent reboot of the Damietta LNG plant. Last year, it produced its first LNG cargo since it was shut down back in 2012, an important milestone in Egypt's return to glory. The liquefaction plant, owned by SEGAS, has a capacity of 7.56 billion cubic metres (bcm) per year.

Moreover, the Arab Gas Pipeline has also been resurrected, which links Egypt with other eastern Mediterranean partners. The first phase of repairs to the pipeline are expected to be completed early this year to allow for the delivery of Egyptian gas to Lebanon.

> "Interest in the upstream sector remains extremely high."

Upstream interest

It is quite a turnaround, and one driven by the astounding offshore discoveries over the past decade. Interest in the upstream sector remains extremely high following a recent bid round that saw Italian operator, Eni, dominate – it has played a starring role in the recent revival of Egypt's ambitions.

At the start of 2022, it netted five more exploration licenses covering areas in the Eastern Mediterranean Sea, the Western Desert and the Gulf of Suez, underscoring its enduring commitment to the country. The new blocks include EGY-MED-E5, in partnership with bp, another super major that has been keen on Egypt's offshore for many years. Eni is now Egypt's main producer, a title that it is clearly keen to hold on to.

"The bid results are aligned with Eni's strategy to keep exploring and producing gas to sustain the Egyptian domestic market and contribute to LNG export, thanks to the recent restart of the Damietta LNG plant," the company noted in a press statement. It added that the new licenses are all placed within "prolific basins" with proved petroleum systems able to generate both liquids and gas. The areas can also rely on nearby existing producing and processing facilities and on a market that will allow quick valorisation of any potential exploration discoveries, the Eni statement added.

More crude oil is also being found, with Eni unveiling a discovery a year ago on its Meleiha concession, in the Western Desert – it adds 10,000 barrels of oil per day (bpd) to Eni's gross production from the area, where it partners Russia's Lukoil and Egyptian General Petroleum Corporation (EGPC).

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Ongoing investment

Other major operators, such as BP – a 10% stakeholder in the Shorouk concession that contains the mighty Zohr gas field – are equally busy tapping Egypt's upstream potential. The Atoll field development is another of the company's local mega projects, which was brought onstream in 2018, and is now producing around 300 mmscfd for the country's national gas grid. Production from the North Damietta concession was also supplemented by the 2020 production start-up of the Qattameya discovery. Looking ahead, Satis West, the first Rupelian development in the Nile Delta, is expected to backfill Qattameya by 2024 along with the new Harmattan project.

This upstream success is driving investment in industrial projects in Egypt as well.

bp and Eni are both shareholders in United Gas Derivatives Company (UGDC), a natural gas liquids (NGL) plant extracting liquefied petroleum gas (LPG) and propane, in partnership with GASCO, the Egyptian midstream gas distribution company. UGDC is adding value through extracting LPG and condensate needed for the domestic market, as well as producing propane, an important feedstock for the nation's expanding petrochemicals industry.

The resurgence of Egypt's gas industry has likewise attracted smaller and mid-size investors too, such as the US' APA Corporation, Canada's Transglobe Energy and UAE-based Dana Gas, among many others. APA (formerly Apache Corp) has a busy year ahead, with a drilling rig count already at 11 in 2021. The company plans to grow its investments this year, according to John J. Christmann IV, APA's chief executive and president, "Returning Egypt to a growing production profile and helping to advance the country's position as a regional energy hub."

> "A central part of these plans includes rolling out a network of pipelines to supply regional states."

International sales

On the back of all this upstream investment, Cairo's long-term strategy is to become a major energy hub in the eastern Mediterranean region, where big gas finds have also been made offshore Israel and Cyprus.

As well as LNG, a central part of these plans includes rolling out a network of pipelines to supply regional states including Lebanon, Jordan and Syria, as well as old rival, Israel. That also extends to the countries of southern Europe.

Officials in Greece recently announced plans to expand cooperation with Egypt over LNG supplies and explore the possibility of a subsea gas pipeline between the two countries. Talks are also underway with other European states, including Italy, where links are already strong given Eni's in-depth involvement in the Egyptian gas sector.

Over the next few years, Cairo is also looking to add value to its exports too, with investment in domestic oil and gas processing, refining and petrochemicals.

There are hopes of boosting exports from the chemicals sector to at least US$10bn by 2025, for example, according to plans outlined by the Chemical and Fertilisers Export Council. As well as expanding capacity, this includes a focus on new international markets, especially in Africa, to achieve sales goals.

After a challenging decade or so, plus all the uncertainties of the past two years as a result of the Covid-19 crisis, Egypt's natural gas industry is back in business. ■

Transforming Egypt's oil and gas industry

Ossama Maguid, Egypt country manager at Yokogawa Middle East & Africa, outlines how the company is helping to optimise Egypt's oil and gas operations through its MAIC capabilities.

How do you view prospects in the Egyptian oil and gas market for your automation solutions?

The Ministry Of Petroleum (MOP) has an ambitious vision for efficient management across total supply chain assets from well to wheel (W2W). In 2016, it developed a strategy to completely transform the petroleum industry to achieve sustainability, in line with Egypt's Vision 2030. The Modernization Project covers the whole value chain and aims at establishing an agile organisation structure through deep changes in ways of working. Energy subsidies, production and consumption levels, and operational efficiency were classified as crucial to achieve financial sustainability.

To achieve this vision, 12 actionable initiatives were consolidated into seven pillars: Upstream Investment Attraction; Sector Structure Reform; Human Resources (HR) Management; Downstream Performance and Energy Efficiency; Upstream Performance; Oil and Gas Hub Strategy; and Decision Support and Data Flow.

EGPC, under the MOP umbrella, is undergoing a number of projects to integrate operations through a centralised control room within refineries as an initial step for full integration through a centralised command centre, recognising the value of big data analytics in value chain improvement.

Image Credit: Yokogawa

Ossama Maguid, Egypt country manager, Yokogawa Middle East & Africa.

Can you outline the capabilities of Yokogawa's MAIC?

As a Main Automation & Information Contractor (MAIC), Yokogawa provides services covering all areas of project execution related to plant automation including budgeting, scheduling, resourcing, and risk management. Our services optimise plant operations by integrating both the management system and manufacturing system domains, contributing to the improvement of customer supply chain management, strengthening of market response capabilities, and maintenance of flexibility. These services will assure seamless OT/IT integration, adding value to customer TOTEX, maximising profitability and minimising losses.

Our unique MAIC capabilities have been developed through more than 105 years of experience. Yokogawa can provide predictable and reliable project execution; maximum focus on costs and schedule; management of change; flawless start-up; total energy management solutions; and process improvement solutions. Benefits are CAPEX and OPEX improvement, standardisation and project schedule improvement.

How will Yokogawa's solutions add value to the Ministry of Petroleum's DX plan?

The Ministry of Petroleum has experienced improved profitability whilst addressing challenges in the four areas of HSSE (health, safety, security, and environment), efficiency, asset availability and human reliability.

In addition, it has become necessary in recent years to tackle changes in the business environment—the visualisation and optimisation of the value chain and sustainability—and the COVID-19 pandemic has elevated the complexity of the situation. Increased flexibility in production, such as with remote operations, is required as firms seek to continue business while ensuring the safety of the workforce.

To address these concerns, it is vital to realise smart manufacturing through the utilisation of digital technologies, thereby optimising the entire value chain by integrating and seamlessly intertwining the information scattered across each element of the company's value chain. Yokogawa is advocating a cloud-based integration architecture as one step forward in achieving this information integration.

The recent evolution in digital technologies has enabled OT/IT convergences that make it possible to transcend layers. Now, we can expect the realisation of new AI or machine learning applications, such as advanced decision support systems that employ management-level information with field-level real-time data.

We believe the goal of smart manufacturing is autonomous operations, which can be the key to solving the challenges raised here. Yokogawa will continue to provide various solutions and deliver workshops to support the journey towards smart manufacturing and autonomous operations. We would like to contribute to a better and more sustainable society alongside our customers.

How do you think Yokogawa can contribute to capacity building in the Egyptian oil and gas sector?

As a company, our goal is to contribute to society through broad-ranging activities in the areas of measurement, control and information. Individually, we aim to combine good citizenship with the courage to innovate. We can help clients transform how they work through an aligned, open working environment, help them grow and develop their workforce capabilities, and establish sustainable performance improvement. ■

Decarbonising ammonia production

In the race to develop low and zero-carbon ammonia solutions, fertiliser companies across the region are blazing a trail with the production of blue and green ammonia, as Elan Habib, regional director, Middle East at ICIS explains.

AMMONIA IS THE starting point for all mineral nitrogen fertilisers, forming a bridge between the nitrogen in the air and the food we eat. Around 70% of ammonia is used to make fertilisers, with the remainder used for a wide range of industrial applications, such as plastics, explosives, and synthetic fibres.

Aside from its traditional uses, ammonia offers a triumvirate of opportunities in the energy transition for energy storage, a zero-carbon fuel and as a hydrogen carrier. Ammonia can be readily stored in bulk as a liquid at modest pressures (10-15 bar) or refrigerated to -33°C. This makes it an ideal chemical store for renewable energy. A bonus is that an existing distribution network exists where ammonia is stored in large, refrigerated tanks and transported around the world by pipes, road tankers and ships.

The prospects for ammonia as a zero-carbon fuel are promising, particularly for shipping. It can be burnt in an engine or used in a fuel cell to produce electricity with only water and nitrogen as by-products.

Finally, it can assist in the hydrogen economy by overcoming some of hydrogen's volumetric challenges. Hydrogen is difficult and expensive to store in bulk because it needs cryogenic tanks or high-pressure cylinders. By contrast ammonia is easier and cheaper to store and transport and it can be readily cracked and purified to produce hydrogen gas when required.

Given its composition of three parts hydrogen and one part nitrogen, as well as long-established logistics infrastructure and favourable liquefaction temperature – -33°C versus minus 253°C for hydrogen – ammonia is also the preferred choice of producers and traders seeking to move hydrogen quickly, efficiently, and cost-effectively.

Roadblocks for ammonia growth

If ammonia is to play a growing role beyond its current portfolio within the chemical sector, there is one major hurdle to overcome. Current ammonia production methods are not only energy intensive but are responsible for around 2% of all global carbon emissions annually. That figure has long troubled fertiliser industry players in the Gulf Cooperation Council (GCC) and beyond, and so it is pleasing to see there is now a co-ordinated effort from producers to reduce greenhouse gas (GHG) emissions through the adoption of new technology and techniques to reduce or eliminate carbon from the production process.

ADNOC is planning to create a world-scale blue ammonia production facility at the TA'ZIZ industrial ecosystem in Ruwais, Abu Dhabi.

Image Credit : ADNOC

To decarbonise will require either blue or green ammonia. Blue ammonia is produced through the traditional steam methane reforming (SMR) process, but with the addition of carbon capture and storage (CCS). According to The Committee on Climate Change, up to 90% of carbon dioxide could be captured, and while this degree of carbon emission reduction is impressive, for net-zero carbon hydrogen production, this must be improved on.

The answer here is green ammonia production. In this process, hydrogen is produced through the electrolysis of water, which is a well-established process. Nitrogen is obtained directly from air using an air separation unit which accounts for 2-3% of the process energy used. Ammonia is produced using the Haber-Bosch process powered by sustainable electricity.

Middle East leading the ammonia charge

For the GCC countries an ambitious and exciting new chapter in the development of next-generation clean energy solutions began in September 2020, when Saudi giants Aramco and SABIC teamed up to achieve the world's first shipment of blue ammonia. The pair sent 40 tonnes of the low-carbon ammonia to use in a power station to produce zero-carbon power generation, paving the way for the further use of hydrogen in the energy system.

The production of the blue ammonia leveraged existing infrastructure as the supply chain begins at the Saudi Aramco oil and gas production facilities, where hydrocarbons are processed into blue ammonia at Jubail, the largest industrial city in Saudi Arabia located in the Eastern province. In the production, 50 tonnes of carbon dioxide were captured during the process, 30 tonnes of which were used in SABIC's Ibn-Sina methanol plant. The

remaining 20 tonnes were transported and injected into the Uthmaniyah oil field for Enhanced Oil Recovery (EOR).

While cargo was relatively small (around 1.6mn tonnes per month of traditional (grey) ammonia is moved by marine vessel), the shipment nevertheless acted as a catalyst for producers in the GCC and beyond to announce significant investment in related projects.

Blue ammonia is critical to Japan's zero carbon emission ambitions to sustain the balance between the environment and the economy. Around 10% of power in Japan can be generated by 30mn tonnes of blue ammonia. Nations such as Japan cannot necessarily utilise CCS or EOR due to their geological conditions. The carbon neutral blue ammonia/hydrogen will help overcome this regional disadvantage.

Another collaboration further enhanced Japan's efforts to decarbonise industry, with Abu Dhabi National Oil Company (ADNOC) and Fertiglobe combining this year to sell the first cargo of blue ammonia from the UAE to Itochu in Japan, for use in fertiliser production. Two further sales to Japanese buyers – Idemitsu and INPEX – quickly followed, and many more deals are expected as ADNOC is planning to create a world-scale blue ammonia production facility at the TA'ZIZ industrial ecosystem in Ruwais, Abu Dhabi. The design contract for this project has already been awarded, with a final investment decision for the project expected in 2022, and start-up likely in 2025.

> "Ammonia offers a triumvirate of opportunities in the energy transition."

Meanwhile, ammonia has also been identified as a marine fuel of the future, hence why Abu Dhabi National Energy Company and Abu Dhabi Ports are discussing the development of an industrial scale green hydrogen to ammonia export project. The liquid ammonia would supply ships converted to use ammonia as a bunker fuel and be exported via specialised gas carriers.

At the futuristic Red Sea city of Neom in Saudi Arabia, a US$5bn world-scale green hydrogen-based ammonia production facility is under construction. It is scheduled to start production in 2025, and the 1.1mn tonne per year facility will see exclusive offtake partner Air Products move green ammonia around the world to be dissociated to produce green hydrogen for the transportation market.

A growing global market

It is not just in the Middle East where such environmentally friendly fertiliser projects will take place. With Japan seeking to import 3mn tonnes per year of blue/green ammonia by 2030 for use in power generation, massive plants are also planned for a series of sites in Australia, Chile, and Russia. In the short to medium term at least, it remains to be seen what sort of price premiums blue and green ammonia can attract, but given the global drive to sustainable energy solutions, financial incentives from governments are anticipated, while pressure from climate aware consumers should mean higher prices do not meet too much resistance.

What is clear, is with extensive experience, existing infrastructure, strategical geographical location and the support of their governments and foreign investors, fertiliser producers across the GCC are ideally placed to take advantage of the many upcoming opportunities in the blue and green ammonia/hydrogen segment. ■

Showcasing technologies for sustainability

The World Future Energy Summit, hosted by Masdar as part of Abu Dhabi Sustainability Week, and held in partnership with the Abu Dhabi Department of Energy and NEOM Energy & Water, took place from 17-19 January in Abu Dhabi.

THE WORLD'S LEADING business event for future energy and sustainability saw some of the world's most powerful investors meet in person to explore business opportunities and discuss pathways to a sustainable future. 300 leading global businesses showcased advanced technology and innovations in clean energy, while seven country pavilions including Japan, Germany, China, Italy, Korea, France, and Switzerland connected emerging markets with top global technology players. 18 new sustainable development innovations from around the world were on display as part of 'Innovate,' a global Masdar City initiative for knowledge exchange.

The event offered more than 200 sessions of essential industry content on transformative technologies and developments, across the Solar & Clean Energy, EcoWASTE, Climate & Environment, Smart Cities, and Water forums. They featured case studies and presentations by leading regional government entities including Abu Dhabi Department of Energy, NEOM, TAQA, Tadweer, ENEC and EWEC. Future energy and sustainability leaders presenting new technologies and participating in panel discussions included Total, BP, NEXTracker, Sungrow, GHD, Ecoppia and Rolls Royce.

The World Future Energy Summit presented an evaluation of net-zero and decarbonisation strategies for the benefit of governments the world over. New technologies for carbon capture and hydrogen use were discussed and are especially relevant today as governments have committed to achieve net zero emissions in their campaign against climate change. The UAE leads the MENA region with its 'Net Zero by 2050' strategic initiative.

The International Renewable Energy Agency (IRENA) forecasts that global energy transition investment will have to increase by 30% over the planned investment to US$131 trillion between now and 2050. Key forums at the World Future Energy Summit 2022 discussed the future for carbon capture, how the use of hydrogen will increase and play a central role in decarbonisation, the electrification of supply, and the use of alternatives such as biofuels, refuse-derived fuel, and scrap.

Giving a keynote speech at the Climate and Environment Forum, H.E. Eng. Yousef Al Ali, assistant undersecretary for the Electricity, Water & Future Energy Sector at UAE Ministry of Energy and Infrastructure said, "The UAE was the first in the MENA region to announce its 'Net Zero by 2050' strategic initiative. To achieve our net-zero ambition, we plan to invest US$163bn to diversify our energy mix, decarbonise hard-to-abate sectors, build the required infrastructure and improve energy efficiency. We are driving clean electrification through solar and nuclear, implementing transparent policies, improving energy efficiency, reducing carbon and methane emissions, and turbocharging innovation to commercialise hydrogen. Our strategies aim to unlock capital flows in support of clean energy transitions and ensure reliability and affordability.

> "Our strategies aim to unlock capital flows in support of clean energy transitions and ensure reliability and affordability."

"The most exciting development is the potential of the growing hydrogen economy as the world strives to achieve net-zero commitments. Hydrogen is a key measure to combat climate change and will be crucial to decarbonise hard-to-abate industries, such as steel, cement, aviation, and shipping."

"The World Future Energy Summit at Abu Dhabi Sustainability Week is the must-attend event of the year," said Frederic Claux, managing director, Thermal and Supply, Asia Middle East and Africa at Engie.

"Coming together with global leaders from government, businesses and technology pioneers is imperative if we are to achieve our 2045 net-zero commitments. We used this platform to sign major deals in the field of green hydrogen, tangibly demonstrating our support of the region's climate ambitions. We look forward to next year's event." ■

Image Credit : RX Global

The World Future Energy Summit facilitated many business-to-business discussions.

Image Credit : IRENA

New global power dynamics

IRENA says green hydrogen could disrupt global trade and bilateral energy relations, reshaping the positioning of states with new hydrogen exporters and users emerging.

IRENA estimates that more than 30% of hydrogen could be traded across borders by 2050.

RAPID GROWTH OF the global hydrogen economy can bring significant geoeconomic and geopolitical shifts giving rise to a wave of new interdependencies, according to new analysis by the International Renewable Energy Agency (IRENA). "Geopolitics of the Energy Transformation: The Hydrogen Factor" sees hydrogen changing the geography of energy trade and regionalising energy relations, hinting at the emergence of new centres of geopolitical influence built on the production and use of hydrogen, as traditional oil and gas trade declines.

Driven by the climate urgency and countries' commitments to net zero, IRENA estimates hydrogen to cover up to 12% of global energy use by 2050. Growing trade and targeted investments in a market dominated by fossil fuels and currently valued at US$174bn is likely to boost economic competitiveness and influence the foreign policy landscape with bilateral deals diverging significantly from the hydrocarbon relationships of the 20th century.

"Hydrogen could prove to be a missing link to a climate-safe energy future," Francesco La Camera, director-general of IRENA said. "Hydrogen is clearly riding on the renewable energy revolution with green hydrogen emerging as a game changer for achieving climate neutrality without compromising industrial growth and social development. But hydrogen is not a new oil. And the transition is not a fuel replacement but a shift to a new system with political, technical, environmental and economic disruptions."

"It is green hydrogen that will bring new and diverse participants to the market, diversify routes and supplies and shift power from the few to the many. With international co-operation, the hydrogen market could be more democratic and inclusive, offering opportunities for developed and developing countries alike."

IRENA estimates that more than 30% of hydrogen could be traded across borders by 2050, a higher share than natural gas today. Countries that have not traditionally traded energy are establishing bilateral energy relations around hydrogen. As more players and new classes of net importers and exporters emerge on the world stage, hydrogen trade is unlikely to become weaponised and cartelised, in contrast to the geopolitical influence of oil and gas.

Cross-border hydrogen trade is set to grow considerably, with more than 30 countries and regions planning for active commerce already today. Some countries that expect to be importers are already deploying dedicated hydrogen diplomacy, such as Japan and Germany. Fossil fuel exporters increasingly consider clean hydrogen an attractive way to diversify their economies, for example Australia, Oman, Saudi Arabia and the United Arab Emirates. However, broader economic transition strategies are required, as hydrogen will not compensate for losses in oil and gas revenues.

The technical potential for hydrogen production significantly exceeds estimated global demand. Countries most able to generate cheap renewable electricity will be best placed to produce competitive green hydrogen. While countries such as Chile, Morocco, and Namibia are net energy importers today, they are set to emerge as green hydrogen exporters. Realising the potential of regions like Africa, the Americas, the Middle East, and Oceania could limit the risk of export concentration, but many countries will need technology transfers, infrastructure and investment at scale.

The geopolitics of clean hydrogen will likely play out in different stages. The report sees the 2020s as a big race for technology leadership. But demand is expected to only take off in the mid-2030s. By that time, green hydrogen will cost-compete with fossil-fuel hydrogen globally, poised to happen even earlier in countries like China, Brazil and India. Green hydrogen was already affordable in Europe during the 2021 spike in natural gas prices. Refurbishing natural gas pipelines is likely to further boost demand and facilitate hydrogen trade.

Countries with ample renewable potential could become sites of green industrialisation, using their potential to attract energy-intensive industries. Furthermore, having a stake in the hydrogen value chain can boost economic competitiveness. The manufacturing of equipment like electrolysers and fuel cells in particular could drive business. China, Japan and Europe have already developed a head start in the production, but innovation will shape the current manufacturing landscape further.

Green hydrogen may strengthen energy independence, security and resilience by cutting import dependency and price volatility and boosting flexibility of the energy system. However, the raw materials needed for hydrogen and renewable technologies could draw attention to material security. Shortages and price fluctuations could reverberate through hydrogen supply chains and negatively affect cost and revenues.

Shaping the rules, standards and governance of hydrogen could lead to geopolitical competition or open a new era of enhanced international cooperation. Assisting developing countries in particular to deploy green hydrogen technologies and advance hydrogen industries could prevent the widening of a global decarbonisation divide and promote equity and inclusion, creating local value chains, green industries, and jobs in renewable-rich countries. ■

Image credit: Adobe Stock

Coming together to advance well intervention

OWI ME 2022, the Middle East's leading well intervention conference, returns to Abu Dhabi for its seventh edition on 28-29 March.

OWI ME 2022 will provide an opportunity for operators and service providers to come together to optimise well programmes.

OWI ME IS the annual meeting point for leading operators to come together to discuss the current market, define their well intervention strategy and identify new solution providers for future campaigns.

After the 2021 virtual event, the well intervention community is keen to reunite face-to-face, and OWI ME 2022 provides the ideal opportunity to do just that. More than 25 expert speakers will provide insight on the most business critical topics and share new best practices from current and past projects, allowing attendees to optimise intervention strategies using the latest technologies, maximise well operation efficiency and hit the ground running post-pandemic. With more operator speakers than ever before, and a dedicated technology session, OWI ME 2022 is the perfect place for operators and service providers to network and come together to optimise well programmes.

Key themes for OWI ME 2022

- **Market Status:** Establish the latest well intervention activity within the industry to help position your business for the future
- **Well Integrity:** Utilise innovative monitoring techniques for managing casing and annulus pressure to ensure downhole integrity
- **Well Productivity:** Access new stimulation methods including EOR to maximise production from ageing fields
- **Technology:** Evaluate cutting-edge rigless and downhole technologies to apply to your integrity, production and P&A toolbox
- **Plug and Abandonment:** Debate the most cost effective strategies for well abandonment and decommissioning throughout the Gulf
- **Sustainability:** Join a major Gulf operator to discuss the role sustainability plays in their future well operation strategy.

> "There is a large appetite for new technologies and more efficient ways of conducting operations."

The line-up of expert speakers includes Fayez Issa, group well integrity advisor, **ADNOC**; Tural Yusubov senior engineer, integrity **ADNOC**; Aala Abbas, Wells C, I & I engineer, **BP**; Siddharth Jain, field development team lead, **SNOC**; John Moffat, senior abandonment and decommissioning engineer, **Dragon Oil**; Bruce Trader, president **MADCON**; Mohamed Muhiz Kuthubdeen, senior well integrity and intervention engineer, **Dubai Petroleum**; Mohammad Rehan, senior contracts and procurement advisor, **Saudi Aramco**; and Faisal Al Nakeeb, senior well integrity engineer, **SNOC**.

"There is a large appetite for new technologies and more efficient ways of conducting operations," comments Rachael Brand, project manager at Offshore Network. "With the current oil prices, many organisations are feeling the pressure and looking to maximise production; OWI ME aims to address these issues.

"P&A is also an increasingly important focus in the Middle East. With insight from ADNOC and SNOC, and Dragon Oil's innovative decommissioning campaign a discussion topic, OWI ME 2022 is the place to get the inside track on the latest best practices.

"There is also the opportunity for more interactive networking, with a sustainability break-out session and operator roundtable, where operators are given the chance to openly discuss their current challenges. Service providers will also present their latest technologies in our Technology Showcase Hall, to enable in-depth discussions on the uses of each technology, service and product." ■

To find out more, download the brochure here: https://offsnet.com/owi-me/conference-brochure
For any questions or to discuss speaking and sponsorship opportunities, please reach out to Rachael Brand, project manager, Offshore Network:
+44 (0) 202 3409 3041 | rbrand@offsnet.com
www.offsnet.com

Building and maintaining effective well integrity systems

Faisal Al Nakeeb, senior well integrity engineer, SNOC, discusses how to go about devising a well integrity system, and how SNOC is tackling well integrity issues.

How would you go about devising a well integrity system, and what factors would need to be taken into account when doing so?

Creating a Well Integrity System (WIS) is a complicated process that requires a thorough understanding of the well's current status and hazards, the knowledge of the reservoir properties, the legal international and local framework in which the WIS is going to be implemented, the new technologies available in the market, the risks the wells are facing, the company plan for the wells along their full life cycle and their production prospects, etc.

Based on the factors above, a new Well Integrity System should be created following the next steps:

a. Preliminary collection of data and analysis of previous incidents and well history to assess the initial status of the wells and their hazards.

b. Creation of a company tailor-made well integrity framework and procedures, including the definition of the barrier philosophy, performance standards determination, handover requirements, KPI's establishment, annulus pressure management, definition of roles and responsibilities, monitoring of wells, maintenance of wellheads and trees, etc.

c. Detailed collection of well data. Risk assessment and prioritisation of actions.

d. Creation and execution of a yearly work plan to adapt the reality of the wells to the new Well Integrity System requirements.

e. Revision of the work outcome and yearly plan, lessons learned creation. Continue WIS improvement.

How can you ensure operational excellence and continuous improvement in well integrity systems?

Operational excellence and continuous improvement are based on a non-stop and constant analysis of the data obtained from the different wells, incidents, failures, lessons learned, preventive activities, audit results, KPI's, etc. This data would end up being the cornerstone of the PDCA (Plan-Do-Check-Act) methodology to be used. This is based on the following:

Plan: Establish the activities that need to be improved and the objective to be achieved.

Do: Execute the activities determined in the 'Plan' section above. Consider carrying out pilot projects first.

Check: Compare the results obtained with the target initially set. Get ready to modify the initial plan if the results are not as expected.

Act: Fully implement and standardise the improvements. Lessons learned to be collected. This is the new baseline for future developments.

Can you outline some of the well integrity issues you experience at SNOC, and how you go about tackling them?

SNOC possesses some wells which are more than 30 years old in a highly corrosive environment, which makes well integrity a critical element. Probably the most challenging well integrity issue SNOC has to deal with is the management of the Sustained Annulus Pressure (SAP).

Sustained Annulus Pressure (SAP) is tackled through real-time alarms and annulus pressure monitoring systems, bleed-off of annulus pressure (if needed), continuous field surveys and, in case of contingency, SNOC is ready to use resin solutions to reduce the annulus pressure. Moreover SNOC has performed and plans to perform workover (WO) operations to replace the packerless completions with completions with packer in order to isolate potential casing leak paths downhole.

Are there any new technologies or techniques that you think offer exciting possibilities in terms of well integrity?

Well Integrity is a very young discipline which had to suddenly grow after the Deepwater Horizon disaster in 2010, hence there is still huge room for development. Based on this and increasing well integrity issues due to the aging well stock number, there is a sensational potential for several new technologies in the future. I find the following the most fascinating:

- Real-time leak detection and analysis
- New chemicals (brines, resins, mud) and new technologies (self-repair cements, new annulus materials) to prevent or solve Sustained Annulus Pressure (SAP) issues
- Acoustic and Temperature Optical sensing technology (DTS & DAS) to monitor the integrity of wells
- Real-time annulus pressure monitoring
- Automated pressure bleed off systems
- Big Data analysis and machine learning to predict well integrity failures. ■

Faisal Al Nakeeb will present on 'How to build a well integrity system from scratch' at OWI Middle East.

Image Credit: SNOC

Faisal Al Nakeeb, senior well integrity engineer, SNOC.

Combining operational AI and risk for **smarter decisions**

Dr Claus Reimers, SVP Products and Technology, Lloyd's Register, says that operators can make smarter and more accurate decisions by combining risk and AI.

A SIGNIFICANT PART of achieving operational excellence for any business is mitigating threats to employee safety, environment, product or share price, to name a few. Risk should not be treated as a static concept; it changes constantly as operational conditions do – however, given industry statistics on downtime, emissions leaks and safety incidents, it is clear that more could be done to identify and mitigate risk ahead of time. We estimate that more than a trillion dollars is lost in the process industry alone every year by unplanned downtime, while 40% of methane emissions are as a result of leaks.

Asset integrity and performance sit at the very heart of improving these aspects of operational excellence. While most operators monitor equipment behaviour through operational data (MES etc.), fewer are able to gain deep and actionable insights from it that would allow them to minimise risk and improve overall performance.

As such, there is a substantial opportunity for operators to use artificial intelligence (AI), real-time digital twin technologies and modern asset performance management techniques to support operational excellence through a better understanding of the impact critical assets have on safety, environment and the bottom line. However, to do so, they must first bridge the gap between operational technology and operational management.

Lloyd's Register has been developing a solution that empowers operators to make smarter decisions in pursuit of operational excellence. In collaboration with Falkonry Clue, the solution combines operational awareness from real-time data, allowing users to predict possible issues based on operational conditions, with the ability to prioritise risk and prescribe the right activities for the corresponding failure modes using Lloyd's Register's AllAssets. Coupling operational AI with risk gives operators real-time visibility and a depth of insight into their operations that will not only have an immediate positive impact but will also create longer-term benefits such as reduced downtime, improved sustainability, and enhanced management of risk and safety.

Image Credit : Adobe Stock

There is a substantial opportunity for operators to use AI, digital twin technologies and modern asset performance management techniques to support operational excellence.

It is thought that siloed data can cost companies as much as 20% in lost revenue every year. To address this, AllAssets creates a centralised point for an operator's engineering data, using its integration capabilities to break down data siloes and brings information from other data sources to consolidate those in a single view. Asset risk is then qualified by running risk models to create a risk profile. This produces a series of metrics which help operators to prioritise and optimise their maintenance activities based on availability, reliability and commercial impact. AllAssets aggregates more than 20 years of digital engineering content as well as feedback from its deployment across millions of assets to recommend the best maintenance and mitigation activities for the equipment based on static data.

> "It is thought that siloed data can cost companies as much as 20% in lost revenue every year."

Falkonry Clue connects with real-time operational data (from a data historian, for example). Its automated condition discovery function creates a digital fingerprint of each asset to monitor its health and productivity in real time. This allows it to learn the correct behaviour of the equipment and alert on any deviations. After the behaviour has been categorised as a possible issue, or a normal condition, the engine will utilise this knowledge to improve its predictive capabilities.

So, what happens when a possible failure has been detected? Well, that is when AllAssets comes into play: linking pattern recognition technology with digital engineering content means to go from early detection of possible failures to prescriptive actions to

mitigate the equipment's risk. Aligned with corresponding failure modes, it provides the necessary insights to act swiftly on the issues and supplies a potential root cause explanation to provide context. Through a process of continuous learning, a model is built to highlight when the algorithm might suggest the incident will happen again, known as an event horizon estimation.

Introducing operational AI in this way creates a predictive digital twin and provides the operator with a seamless view of risk and real-time conditions based on operational data. From this view, potential impacts to reliability and safety can be easily inferred at every level, helping all departments of the business strive for operational excellence.

In summary, the solution allows operators to be much more dynamic in the way that they approach risk and performance simultaneously, providing an opportunity to understand risks in that moment, and also how they may evolve over time. By bringing together operational and risk data, analysing it in context with the process and/or plant and then creating actionable insights, the solution offers a holistic, end-to-end approach that can positively impact operational excellence. The solution is designed as such that the operational management level will also have much greater visibility and understanding of risk, allowing them to better inform long-term planning and impacts on changes on operational conditions, which is key for planning and forecasting.

Ultimately, through combining risk and operational AI, operators can make faster, more accurate and more confident decisions helping them to achieve a wide range of safety, reliability, sustainability and economic goals in pursuit of operational excellence. ■

Image Credit : Lloyd's Register

Operators need to bridge the gap between operational technology and operational management.

Paving the way to economic success

Aramco has progressed its localisation objectives with the signing of 50 new Memoranda of Understanding (MoUs) at the In-Kingdom Total Value Add (iktva) Forum and Exhibition.

THE SIXTH EDITION of the event was inaugurated by HRH Prince Saud bin Nayef bin Abdulaziz Al-Saud, governor of the Eastern Province, in the presence of HRH Prince Abdulaziz bin Salman bin Abdulaziz Al Saud, Minister of Energy, HRH Ahmed bin Fahd Al Saud, deputy governor of the Eastern Province, and HE Yasir Othman Al-Rumayyan, chairman of Aramco's board of directors. Progress in Aramco's flagship localisation initiative was showcased at the three-day gathering, which took place from 24-26 January at Dhahran EXPO, in the Kingdom of Saudi Arabia.

Tying in with the Kingdom's Vision 2030 objectives, the iktva programme aims to drive domestic value creation, maximise long-term economic growth and diversification, and build a world-class supply chain that facilitates the development of a diverse, sustainable and globally competitive energy sector in the Kingdom, at a time when global supply chains have been disrupted by the Covid-19 pandemic.

As a result of iktva, 59% of Aramco's spending in 2021 was directed to domestic suppliers, up from 35% in 2015 when the programme was launched.

Held under the theme 'Paving the way to economic success', the iktva Forum highlighted how partnerships with some of the world's top energy, logistics, and manufacturing companies continue to enhance the domestic commercial ecosystem and enable the reliable supply of energy to the world.

The forum also recognised the outstanding achievements of Aramco's programme partners across 10 categories, which include overall iktva performance, training, Saudisation, female representation and exports.

A series of Investment Opportunity workshops presented by Saudi Aramco and featuring various government entities and suppliers showcased investment opportunities for the localisation of specific equipment and services within the Saudi Arabian energy sector. These covered a wide range of areas including oilfield equipment snd services; offshore equipment and services; non-metallics in oil and gas, automotive and renewables; non-metallics in packing applications, building and construction applications, and carbon fibre; metals, such as heat exchanger tubes and pipe fittings; drilling chemicals; process chemicals; instrumentation; electrical sector; environment, including waste management; fire protection; and unconventional resources.

HRH Prince Abdulaziz bin Salman bin Abdulaziz Al Saud, Minister of Energy, addressing the forum.

Image Credit : Aramco

Amin H. Nasser, Aramco president and CEO, said, "It wasn't possible to foresee the consequences of the Covid-19 pandemic, but iktva helped us to prepare for the disruptions it caused to the global supply chain. Our investment in a diversified network of suppliers has helped us maintain a track record of reliability, and iktva continues to prove its value by contributing to an increasingly vibrant, dynamic and business-friendly environment."

> "iktva continues to prove its value by contributing to an increasingly vibrant, dynamic and business-friendly environment."

The iktva programme has helped establish a competitive industrial base, resulting in exports to more than 40 countries. Meanwhile, local content requirements embedded in thousands of contracts have contributed more than US$100bn to the national economy. At the same time, iktva has attracted more than 540 investments to Saudi Arabia from 35 countries.

Innovation and sustainability are essential components of the iktva model, which embraces new technologies, encourages more efficient logistics networks and emphasises the Circular Carbon Economy framework.

Cybersecurity is another programme priority, ensuring both Aramco and its network of suppliers and contractors have robust protections in place to defend against emerging threats and safeguard business continuity.

Major signings included:

- **Schlumberger** – Partnership on climate leadership and digitalisation through localisation initiatives
- **Cameron/TechnipFMC/Baker Hughes** – Wellhead equipment localisation procurement agreements
- **Larsen & Toubro** – Pressure vessel fabrication localisation
- **Sutherland Global Services** – Smart City

services localisation
- **Tanajib Cogeneration Power Company** – Tanajib cogeneration and desalination agreement
- **Honeywell** – Localisation of process automation solutions
- **Alfanar Company** – Carbon fibre investment collaboration.

Reaffirming commitment

A large number of regional and international companies exhibited at the event and reaffirmed their commitment to driving localisation in Saudi Arabia.

Mohammed Mohaisen, president and CEO, Honeywell Middle East and North Africa said, "Saudi Arabia is a highly significant part of our global operation and a key hub for our advanced research and development programmes – the outcomes of which advance critical economic sectors across the Middle East.

"Our technologies, including those developed and manufactured here in the Kingdom, are solving the region's most pressing objectives, from driving forward the energy transition to economic diversification across urbanisation, tourism, transportation, logistics and healthcare. iktva is the ideal platform to demonstrate the impact of our initiatives, projects and facilities in bringing important economic benefits to the Kingdom, as well as supporting the development of the next generation of local engineers and technology experts."

During this year's forum, Honeywell promoted technologies that can help the Kingdom achieve its target of reaching net zero carbon emissions by 2060. These include carbon capture solutions that pave the way for transition to blue hydrogen; the company's single-stage Ecofining process to produce Green Jet Fuel, capable of reducing greenhouse gas emissions by 65-85% compared with petroleum-based fuel; and Honeywell Green Diesel, which is chemically identical to petroleum-based diesel.

Honeywell announced the launch of its Callidus Flare Technology production facility in Jubail, bringing the lowest steam consumption flares to help reduce the carbon footprint of the Jubail petrochemical complex. It will create new jobs in manufacturing and engineering, enhancing local skills and capabilities, Honeywell said. The company earlier launched a gas detection manufacturing facility, also supporting the iktva programme.

Honeywell additionally announced the launch of a new production facility for oil and gas projects (See page 13).

Yokogawa Electric Corporation, the parent company of Yokogawa Saudi Arabia Company, signed a MoU with Aramco allowing the two companies to collaborate and explore potential opportunities for seeding and localising semiconductor chip manufacturing in Saudi Arabia.

Yokogawa will offer its expertise in deploying Minimal Fab technology to Aramco facilities, and will also provide related training, maintenance, and support services.

Alongside its strategic partner Schneider Electric, AVEVA showcased how advanced technological solutions in the fields of big data, cloud, and Artificial Intelligence (AI) can accelerate the digital transformation of Saudi Arabia's industrial sector.

"Our participation at iktva underscores our commitment to driving decarbonisation across Saudi Arabia's industrial sector, while helping unlock new value, boost business competitiveness and create new job opportunities within the Kingdom and throughout the Middle East," said Tobias Scheele, senior vice-president of global accounts. Solutions demonstrated included the AVEVA Unified Operations Center, which offers end-to-end operational visibility across facilities within a single window to maintain uptime, mitigate costs, and manage complexity. Also demonstrated was Digital Twin technology, which combines asset design and predictive analytics in order to create a fully integrated, real-time data visualisation centre that reveals functional insights, unlocks efficiencies, and identifies new pathways to optimise performance.

> "Our participation underscores our commitment to driving decarbonisation across Saudi Arabia's industrial sector."

Mitsubishi Power highlighted key achievements of the brand's localisation strategy, announcing that the company has achieved a 54% Saudization rate and is set to accomplish the target of 60% by 2023. Mitsubishi Power launched a National Program in 2019, to prioritise the development of local talent and expand industrial facilities and capabilities in Dammam to serve Saudi Arabia and the wider region, in line with iktva and Saudi Vision 2030.

Khalid Salem, president, Mitsubishi Power Middle East & North Africa (MENA) said, "The Kingdom's Vision 2030 and its commitment to net-zero by 2060 is testament to the leadership's ambition of transforming the nation, economically and environmentally. Our brand's industry-leading power technology, combined with a strong localisation strategy, has enabled us to provide the best power solutions and value to Saudi Arabia's power infrastructure expansion. We will continue to dynamically support the Kingdom's vision and reinforce our commitment to Saudi Aramco's iktva programme, through localisation of the energy value chain, innovative power solutions and partnerships."

In line with its net zero by 2040 ambition, Mitsubishi Power continues to develop energy solutions and processes that enable hydrogen's transition from industrial use to being the clean fuel of choice. Its J-Series air-cooled gas turbines are capable of operating on a mixture of up to 30% hydrogen and 70% natural gas, which can be increased to 100% hydrogen in the future.

"Mitsubishi Power has long pioneered hydrogen fuel combustion technologies, and our recent large-scale and ambitious projects demonstrate our commitment and accumulated expertise in this field. A key objective for Mitsubishi Power will be to help our customers in Saudi Arabia bend the cost curve of their energy transition with affordable and reliable solutions. This is going to be pivotal in demonstrating how hydrogen can competitively fulfil clean energy expectations and bring us one step closer towards realising Saudi Arabia's net zero by 2060 goal, ultimately transitioning the Kingdom towards a low carbon society," added Khalid.

Rockwell Automation, which has been operating in Saudi Arabia for more than 50 years, signed an MoU with Aramco whereby it will focus on several areas of collaboration, from product localisation to IIOT software, workforce development and training. The goal is to increase the companies' contributions to Saudi Arabia's localisation efforts and create additional employment opportunities as a result. With this partnership, Rockwell Automation aims to participate in Aramco's long-term growth strategy and play a vital role in the Kingdom's expanding energy and chemicals supply chain.

Emerson likewise signed an MoU with Aramco, reinforcing their partnership in advancing localisation initiatives. The agreement recognises Emerson as a major manufacturing and services provider of process automation systems and instrumentation, as well as operator of a central digital hub facility in the kingdom. Currently, Emerson has manufacturing facilities in Jubail, Dammam and the Dhahran Techno Valley, which cover the entire suite of Emerson's Automation Solutions portfolio.

"Emerson's relationship with Saudi Aramco has evolved from a supplier to a collaborative stakeholder that supports the development of local manufacturing from a capability, supply chain and talent perspective. As our manufacturing capabilities in Saudi Arabia have matured, we have built strong relationships with a robust in-kingdom supply chain ecosystem, and a particular focus on local small and medium enterprises," said Liam Hurley, vice president and general manager of Emerson's Automation Solutions business in Saudi Arabia and Bahrain. ■

Putting waste gas to **good use**

As a global leader in flare gas to power generation solutions, Aggreko is well positioned to help its clients navigate the challenges of the energy transition. Oil Review Middle East spoke to Robbie Pond, the company's head of Sector – Oil and Gas (Middle East) to find out more.

HELPING CLIENTS ACHIEVE their energy transition objectives is a big focus now for Aggreko, leading provider of mobile, modular power, temperature control and energy services. Robbie Pond points out that, while the term energy transition may have only recently become common currency, Aggreko has in fact been involved in flare gas to power for around 12 years now.

"We have done more than 200 projects around the world, taking this waste gas and putting it to good use, rather than venting or flaring it, whether it be powering our clients' operations, converting it to energy to sell back to the grid, even doing what we call virtual pipelines where we can move that gas, if it is stranded commercial gas, to different parts of the country where it is needed, to power homes and businesses.

> "In 2020 around 878 mn cubic feet a day was flared in the GCC, enough to power around seven million homes."

"It's a clever solution, part of the circular economy, and a quick win in that there's no big capex spend. When you compare this to some longer-term green energy solutions which take time to develop, test, build and commission, it's something that can be implemented very quickly and makes a big impact as a bridge to net zero."

There is an increasing awareness about the possibilities of flare gas to power, Pond says, and the company is executing a number of projects within the region and globally.

Aggreko has completed more than 200 flare gas to power projects worldwide.

Drone view of the project in the Kurdistan Region of Iraq.

"In other parts of the world there are different commercial evaluations, so for example in North America or Eurasia you're looking to offset the cost of diesel by replacing the diesel with the flare gas. Whereas in the Middle East, diesel is heavily subsidised, so it is more about taking that step change for energy transition. Some governments are prohibiting diesel now, so we're seeing a move away from diesel towards gas and cleaner fuels as well."

Aggreko has just announced that it has completed commissioning of its biggest flare gas to power project in the region to date, in the Kurdistan Region of Iraq, where it was contracted to provide 165 MW of power.

"That is huge, it's a big flagship project which involves large civil works and a long-term commitment," says Pond. "Nevertheless, it has been fast to implement. Within six months of the mega project being awarded, we were on the ground providing half of that power straight away, and we have been ramping up on a regular basis."

The plant is run on approximately 40mn standard cubic feet (SCF) per day of associated petroleum gas from the Saqula field, saving 840 tonnes of CO_2 per day, and cutting flaring by a third. The project is now

> “Large capex projects, some of which were put on hold for the last couple of years, are starting to re-emerge.”

contracted to run for four years, delivering power 24 hours a day, 365 days a year. Built using modular gas generators, the plant can easily be scaled up or down in response to changing gas volumes. Around 60 Aggreko engineers have delivered the project, with 80 local jobs created.

Flaring is still an issue in the region, however, particularly in Iraq, Iran, Saudi Arabia, Oman and the UAE, Pond says.

“In 2020 around 878 mn cubic feet a day was flared in the GCC. That’s around 3.5 GW of potential power, enough to power around seven million homes,” he points out.

“Many of the national and international oil companies in the region are making positive steps, but a lot of those steps are large capex-intensive projects, whereas we can help that transition and step in with a temporary solution or whatever they need to help them get there quicker, providing value not only to the company but to their country. The power doesn’t have to be used in the client’s own operations; it can be used to support remote towns, villages, etc.”

Aggreko is now focused on positioning itself for the energy transition. “We’re committed to net zero by 2030 internally, and across all our services by 2050. So measures such as moving away from diesel to cleaner fuels such as gas and biogases and even hydrogen and solar power, are a priority for us.”

Pond adds that hand in hand with the energy transition comes digitalisation, citing Aggreko Remote Monitoring system, which gives real-time data on how equipment is running.

“For example, we can say you’ve over-specced your equipment, you’re burning too much fuel, we can give you the right size set to reduce you fuel intake,” he explains.

The use of batteries for energy storage is increasing, he adds. “Rather than giving customers 10 generators for example, we can give them eight generators plus a battery. So a lot of it is about reducing fuel, and doing things smarter.”

Discussing the market outlook, Pond sees encouraging prospects for Aggreko, which has had a presence in the Middle East for more than 30 years and has bases in all the GCC countries.

“We’re very optimistic, with the recovery of the oil price and Covid hopefully starting to come under control. Large capex projects, some of which were put on hold for the last couple of years, are starting to re-emerge. We’re definitely seeing an uptick in activity; our task now is to stay close to the customer and help them deliver their projects in the best way we can.” ■

Image Credit: Aggreko

Robbie Pond, head of Sector – Oil and Gas (Middle East), Aggreko.

Collaborating to reduce data barriers

During ADIPEC, held in Abu Dhabi in November, technology giants IBM and Amazon Web Services announced that they would join hands to help bridge an obvious gap that the industry faces today in its digital transformation, a need of the hour. Shilpa Chandran reports.

Image Credit: IBM

Manish Chawla, global managing director, energy resources and manufacturing, IBM.

IBM OPEN DATA for Industries for IBM Cloud Pak for Data, a first-of-its-kind market-ready hybrid cloud platform, and the Amazon's AWS Cloud announced plans to collaborate to reduce data barriers, and help serve the industry better.

Energy companies need solutions that help drive efficiencies to reduce emissions today, and free up capital, time and resources to invest in discovering new, more sustainable energy sources for the future. However, according to a survey conducted by IBM, far fewer oil and gas executives are using data to drive innovation.

The IBM Institute for Business Value (IBV) and Oxford Economics surveyed 350 oil and gas executives in 25 countries involved in defining or executing their organisation's innovation strategy, as the industry faces continued pressure to streamline operations and reduce costs due to overcapitalisation, budget overruns, and production oversupply.

"Data is a critical asset to help fuel energy transition, yet too often energy companies must choose between running applications on-premises or in the cloud, and often each deployment uses a proprietary data format," said Manish Chawla, global managing director, energy, resources and manufacturing, IBM.

> "Too often, energy companies must choose between running applications on-premises or in the cloud."

"This means that rather than using all of that collective data to gather insights, augment operations and inform innovation, some of it was going unused. Our collaboration with Amazon Web Services is addressing the need to make it easier for energy customers to access their data and provides the industry with a flexible solution to meet the challenges of today, as well as more easily adapt as the industry evolves."

Building technologies

By working together, IBM and AWS will accelerate the value of this platform for global customers. The goal is that this combined effort will help serve the needs of energy companies today, with flexibility to adapt to change amid energy transition.

With this collaboration, customers will gain the flexibility to run OSDU Data Platform applications in the AWS cloud or on-premises while addressing data residency requirements, and "unlock greater business value for operational data across industries". The OSDU Forum is a cross-industry collaboration that provides a vendor-neutral framework for companies to develop data platforms against common energy industry standards.

The new comprehensive solution is built on Red Hat OpenShift, a Kubernetes platform and open architecture, designed to run and operate applications, and will run on the AWS Cloud, simplifying the ability for customers to run workloads in the AWS cloud and on-premises. The two companies also intend to collaborate on further co-development of future functionality to provide greater flexibility and choice on where to run OSDU applications.

Enterprise data management solution

IBM and technology company Schlumberger, with whom the software company presented its solutions at ADIPEC, announced the hybrid cloud solution earlier this year. The Enterprise Data Management Solution was designed to expand access to customers globally to reduce time for analysis and accelerate decision-making, with all workflow data available in one place.

This solution will provide energy operators with full interoperability, making their data accessible by any application within their exploration to production (E&P) environment through the OSDU common data standard to enable easy sharing of information between teams. This data solution is engineered to minimise the time for data transfers between applications to deliver reduced costs as well as enabling improved decision making.

IBM has been a leader in combining technology with industry expertise to help clients digitally reinvent their businesses for resilience and sustainability. The organisation is currently extensively involved in new energies. Examples include supporting BP with its electric vehicle charging platform and partnering with Shell to offer decarbonisation-related digital solutions for the mining industry. A big focus, apart from continuing to drive enterprise transformation, is on AI and data. Regionally, ADNOC and IBM Services have collaborated to deploy a first-of-a-kind rock classification solution that is helping preserve knowledge and identify drilling locations. ■

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Remote operations centres for **efficiency gains**

By unifying business operations into a single interface, oil and gas companies can improve their efficiency, agility and reliability, in turn raising profitability, says Rashesh Mody, senior vice president, monitoring and control business unit, AVEVA.

THE OIL AND GAS industry is no stranger to uncertainty, but the events of 2020 highlighted the importance of agility and adaptability more than ever. Covid-19 brought many disruptions, from the sudden need for remote working through to the oil price crash. Many of last year's challenges helped reveal areas of low digital maturity, including the industry's reliance on engineers out in the field and the fact their work was often reactive, rather than pre-emptive. This has led to an acceleration of digital transformation projects as organisations look to secure business continuity and improve automation.

Pivoting to a new energy future

As the global population grows and living standards improve, energy needs are set to continue rising. According to ExxonMobil's latest Outlook for Energy, global demand will rise by 20% by 2040. BloombergNEF's New Energy Outlook 2020 predicts demand for oil will peak in 2035, while gas will continue to rise until at least 2050. At the same time, society is calling for cleaner energy, so oil and gas companies must look to supply their energy with a greater focus on environmental performance. Many are therefore focusing on energy transition and net-zero goals.

Pivoting to this new energy future is challenging, but digitalisation has an important role to play in helping the sector make this transition. Solutions such as remote operations centres can help to optimise efficiencies and meet environmental targets, while ensuring competitiveness thanks to lowering costs and downtime.

The role of a remote operations centre

A remote operations centre (ROC) helps organisations to make better informed decisions by bringing together disparate systems and providing a 360º view across the value chain.

Pulling together information technology (IT), operational technology (OT) and engineering technology (ET) into a converged industrial internet of things (IIoT) interface, a ROC enables organisations to create a single management environment that provides full visibility across the business.

ROCs take advantage of technologies

Rashesh Mody, senior vice president, monitoring and control business unit, AVEVA.

such as artificial intelligence (AI), machine learning (ML) and cloud computing to gather, store and analyse data, which is then turned into actionable insights that drive operational efficiency and safety performance. Operational measures such as yield, efficiency, emissions, throughput and utilisation can be calculated from the plant down to asset level, enabling meaningful comparisons of performance across multiple sites and departments, and ensuring key performance indicators (KPIs) are met.

Furthermore, reporting tools and dashboards allow users to route staff to the highest priority assets, while the overview of assets transforms reactive maintenance into predictive. This is thanks to advanced diagnostics that enable workers to anticipate faults before they occur, through the use of big data analytics.

Many oil and gas businesses including upstream, midstream, downstream, and retail have already made the move to ROCs. This includes Abu Dhabi National Oil Copany (ADNOC), whose Panorama Digital Command Centre is enabling savings of between US$60-100mn through optimised operations. By integrating and monitoring more than 10mn tags across more than 120 dashboards, the Unified Operations Centre allows the oil company to see new value opportunities for the first time – even in brownfield operations.

Times are changing – so must you

The world still relies on oil and gas, but customer demands are changing. They expect energy that's clean, affordable and reliable. To provide this, oil and gas companies must continue to look for efficiencies that will keep costs down, while doing everything they can to lower emissions. In addition, they must continue to weather uncertainties – those that they are used to in the sector, but also those new disruptions that came into being with the pandemic.

Oil and gas firms that are able to access the right information, and quickly, will weather these changeable times more favourably, and business visibility and analytics will be key to their continued success. A ROC allows better collaboration among stakeholders and connects people, sites, systems and processes. It empowers businesses to make the most of their assets, and those that do so are most likely to lead the way in this new energy future. ■

Explosion protection in pressure measurement tech

KELLER AG für Druckmesstechnik provides some advice on pressure measurement technology for potentially explosive environments.

EXPLOSIONS CAN BE violent and tend to leave behind a great deal of damage. With this in mind, the ultimate aim when building electronic devices for use in potentially explosive environments is to completely prevent explosions. KELLER AG für Druckmesstechnik has been producing products for use in explosive environments since 1988. These certified products ensure safe operation in the most diverse range of use cases.

What causes explosions?

An explosion is a sudden chemical reaction involving an inflammable substance in the form of gas, dust, vapour or mist combining with oxygen and releasing large amounts of energy. This leads to an explosive atmosphere if the mixture achieves a very specific concentration ratio. If the concentration is too high (rich mixture) or too low (lean mixture), then a steady combustion reaction will occur, but no explosion. The mixture will only behave explosively on ignition if it is between the upper and lower explosive limit. The environmental pressure and the proportion of oxygen in the air influence the limits of the explosive atmosphere.

Intrinsically safe pressure measurement technology by KELLER

In addition to type d (flameproof enclosure) and type ec (increased safety) ignition protection products, KELLER AG für Druckmesstechnik mainly produces pressure transmitters, level probes and digital gauges of the ignition protection type i (intrinsic safety). Products certified to be intrinsically safe limit the energy so that ignition of an explosive atmosphere cannot be triggered either by sparks or thermal effects.

KELLER is an international company and as such is not only limited to the European market. For this reason, the manufacturer of pressure measurement technology offers a wide range of certifications which can be applied to customer-specific products worldwide.

Image Credit : KELLER AG für Druckmesstechnik

KELLER AG has been producing explosion-proof measurement technology for many years.

Explosion-proof products in use

Products that are suitable for potentially explosive environments have a very wide field of use. KELLER AG has been producing explosion-proof pressure measurement technology since 1988. As a result of this invaluable experience, KELLER's certified products are recognised across many sectors.

Measuring and transmitting

If the products are being used in difficult-to-reach places, the measured data cannot always be processed on site. In cases such as this, KELLER also offers remote transmission units which forward the measured values to a server or the cloud. The recorded and measured data is lastly retrieved and evaluated via a customer application or via KELLER's own KOLIBRI Cloud portal.

> "KELLER's certified products are recognised across many sectors."

Remote transmission units, such as the Box ARC1-SB made by KELLER, are in and of themselves not explosion-proof. Modules used in potentially explosive environments must therefore, as a matter of necessity, be installed outside of the explosive atmosphere. Remote transmission units for certified explosion-proof products contain safety barriers that limit the electrical power delivered to the connected intrinsically safe product. Ignition is prevented from occurring by this barrier and the required explosion preotection is achieved.

Explosion protection of the future

KELLER is currently developing a new type of radio transmission unit which communicates over LoRaWAN or NB-IoT networks (Internet of Things) and can also be installed within potentially explosive environments. This development will make explosion protection even safer, while simplifying the installation of pressure measurement technology in hazardous areas. ■

Completing the net-zero puzzle

Wassim Moussaoui, managing director, Babcock & Wilcox (B&W) Middle East Holdings discusses the importance of hydrogen in the future energy mix and the solutions available to achieve a circular economy in the Middle East.

Image Credit : B&W Middle East Holdings

Wassim Moussaoui, managing director, B&W Middle East Holdings.

Often touted as the 'fuel of the future', much has been made of hydrogen fuel and the role it could have in the future energy mix. As Moussaoui explains, "Hydrogen has been gaining traction in lots of regions including the Middle East and Africa, which has begun attracting a lot of international companies to develop pilot solutions.

"It will be a key player in the transition from the reliance on fossil fuels whether for transportation, energy generation, chemical manufacturing, steel industries, etc. To really exploit this fuel we need to look at it as a complete solution – generating hydrogen is good, but we need to spend money on infrastructure to make it a viable solution for the future."

In the Middle East there have been noticeable investments into hydrogen (whether co-investments or singular) both small and large-scale. For instance, in petrochemical facilities some companies have been looking at hydrogen for their own transportation uses and needs.

To support the switch to hydrogen and generally help companies reduce their CO_2 emissions, B&W have developed the ClimateBright suite of technologies which include four solutions. BrightLoop is an energy production technology that supports industries' low carbon initiatives. It is a chemical looping process using a unique particle which allows it to react with a variety of feedstocks (this is different from other looping systems which require the use of copper nickel, cobalt or other materials).

Moussaoui comments, "The BrightLoop process can be used for a wide range of applications including hydrogen production. The process can make use of different and complicated feedstocks – for example, in the petrochemical industry, petroleum coke (petcoke) is a liability but we can use it in our system as a feedstock. Biogas, biomass, natural gas, you name it, it is a very flexible technology in this regard and it is highly scalable depending on the needs of the customer. CO_2 is also captured in situ which is a very big benefit towards reducing the CO_2 footprint and I believe is essential for the net-zero puzzle."

Alongside the BrightLoop technology in B&W's ClimateBright suite are SolveBright, a post-combustion regenerable solvent based solution to help customers reduce their CO_2 emissions; OxyBright, a combustion process suited for CO_2 isolation and sequestration applications; and BrightGen, which is a hydrogen combustion technology.

Kanoo Energy presents innovative solutions for the energy sector

WITH A RANGE of new products, Kanoo Energy brought the company's technology additions and sustainable energy solutions to ADIPEC in November.

"The global pandemic has drawn increased attention to climate policy and economic resilience," said Ali Abdulla Kanoo, president of Kanoo Industrial & Energy. "Industries are witnessing the shift towards a smarter and more sustainable future. ADIPEC has continued providing opportunities for businesses to meet, learn and discover new products and technologies in their respective industries. We are committed to continue the growth of energy sector and create new opportunities by strengthening our relationships and network across the whole energy sector."

Kanoo Energy presented innovative solutions such as the reverse engineering and 3D printing from Imaginarium and AI-based corrosion monitoring solution from Corrosion Radar from the UK, amongst others.

"Abu Dhabi is a major contributor to the UAE's GDP and hence is an automatic focus market for us. With the Abu Dhabi hydrocarbon sector being the major GDP contributor, any opportunity to showcase into that sector is important for us. The number of new opportunities, including investment by the private sector, that are today available in the energy sector further enhances this interest."

Following the deep concerns discussed at COP26, ADIPEC was used as a forum for players in the regional energy sector to bring under the spotlight solutions that can drive the global ambition of net-zero carbon emissions. Kanoo Energy highlighted such new and relevant technologies such as the direct air carbon capture and storage system (DAC) that helps in reducing CO2 from the atmosphere, and thus reduces the greenhouse effects.

"With the growing urban areas and smart cities becoming the new reality, greenhouse gas emissions are likely to grow along with them. The challenge is to ensure that our smart cities become greener while we manage the challenges imposed. Advancements in renewable energy and electric vehicles have already led to significant reductions in carbon emissions. Carbon emissions are being reduced by generating power on-site with renewables and other climate-friendly energy resources. Some of the recent innovations like rooftop solar panels, solar water heating, small-scale wind generation, fuel cells powered by natural gas or renewable hydrogen are contributing positively to cope up with the issues of carbon emission," explained Kanoo.

Image Credit : Kanoo Energy

The Kanoo Energy stand at ADIPEC.

Kanoo Energy remains at the forefront when it comes to corrosion solutions in oil, gas, refining and petrochemical industry and investing in technological innovations to address issues such as emissions reduction.

"We are currently engaged in strategising, investing into new talent, building cooperation with various OEM's and clients to source new technologies and exchange expertise and know-how, as well as contributing to building national capacities in energy technologies," said Kanoo. This involves Kanoo Group investing into renewable energy, gas fired power solutions, the Internet of Things (IoT), using Artificial Intelligence (AI) in energy production, 3D printing, additive manufacturing, and so on.

As well as the existing value-added solutions, the company's principal partners were also one of the key highlights of their participation at ADIPEC, including Woodfield, Imaginarium, Corrosion Radar, Altanova, Filtervac, UVEX, Clarke Valves, and LPS.

Image Credit : Adobe Stock

Dismal outlook for the tanker market

Surplus supply and high bunker costs are eroding tanker owners' earnings, says Sameer Mohindru, senior pricing editor, Asia Shipping, S&P Global Platts.

Tanker owners are facing many challenges.

TANKER FREIGHT IN the Middle East and North Africa is expected to come under downward pressure over the next few months as refineries slow down imports and processing of expensive crude, the coronavirus pandemic lingers on and high bunker prices erode earnings.

More often than not, crude prices have had a negative correlation with freight, and this drags down the earnings of owners. With OPEC+ unwinding their supply cuts only in phases, oil prices are hovering at their highest levels in more than seven years, but there are more than enough tankers to meet the trade requirements. While a likely increase in the trade of oil and oil products hinges on how the coronavirus crisis pans out in its third year, the return to a pre-pandemic era can still be painful, due to upcoming deliveries and slower scrapping of old ships.

"Tanker markets are expected to be better in 2022, but are not yet back to 'normal' levels," said Ole-Rikard Hammer, Oslo-based senior analyst for oil and tankers with Arctic Securities.

Higher bunker prices are eroding earnings, and most voyages from the Middle East are now loss-making. VLCC owners are currently losing more than US$6,000/day on voyages on the Gulf-North Asia routes, according to the estimates of brokers.

According to the projections of the International Energy Agency (IEA), global oil demand is estimated to have increased by 5.5 mn bpd in 2021 and may rise by another 3.3mn bpd this year. However, tanker owners point out these gains will only make up for lost ground, and the world ironically now has more tankers to meet the same pre-pandemic demand. This explains why dirty tanker freight was mostly static at abysmally lower levels last year, despite the recovery in demand for crude. While oil demand likely expanded by 5%-6% in 2021, total tanker demand only grew by around half this rate, according to the estimates of London-based Maritime Strategies International (MSI).

> "Most voyages from the Middle East are now loss-making."

Tanker brokers estimate that the number of spot market VLCCs loading each month in the Gulf now stands at around 125, still a sixth lower than at end-2019. It is a significant barometer for freight outlook, and during several months in 2020-21 such VLCC fixtures were less than 100.

Surplus ships

The tanker fleet grew by 2.3% last year due to fewer scrappings, even as newbuilds entered the market, according to estimates of Affinity shipbrokers. Almost 70 VLCCs over 20 years old are still in the market, the brokerage said. Trade sources said many of these old ships are moving oil informally from sanctioned countries, and owners are reluctant to scrap them. If the US and Iran were to reach a nuclear deal, then additional demand of around 1.4mn bpd will become formal trade, making this older tonnage redundant. Unless these old ships, which constitute 8% of the fleet, start to get scrapped, potential gains from a recovery in international trade flow will be negated.

Lack of scrapping at a time when there is redelivery of tonnage from floating storage, has combined to keep fleet growth above 3% for much of this year, a level way too high in the weak demand environment, Hammer said. Demolition has been very slow, while deliveries are way higher, said Enrico Paglia, Genoa-based research manager with shipping brokerage and consultancy, Banchero Costa (Bancosta). Hence, the fleet keeps growing, while demand does not increase proportionately. Close to 75 dirty tankers were delivered last year, including around three dozen VLCCs, while demolition has not exceeded 30, including half a dozen VLCCs, Paglia said. Around 40 VLCCs are to be delivered this year, on top of 35 in 2021, according to the estimates of brokers, who expect higher freight only towards the end of 2022 due to seasonal winter demand.

Such demand and supply challenges have made tankers fleet owners a worried lot at a time when crude producers are laughing all the way to the bank. ■

Hydrovolve launches percussive drilling system

HYDROVOLVE HAS LAUNCHED GeoVolve HAMMER, a percussive drilling system set to cut well capital expenditure of geothermal wells by 50%. Powered by HydroVolve's field proven INFINITY engine, it uses percussive impulse energy to fracture the rock ahead of the drill bit, enabling deep drilling into hot, hard rock easier and faster. Operated simply by the flow of pressurised drilling fluid, GeoVolve HAMMER is an all-metal construction allowing it to operate in hazardous environments at extreme temperatures for extended periods.

Currently, the cost of geothermal drilling can account for up to 50% of total well project costs, with the majority of spend due to time spent drilling through difficult rock formations. Drilling through hard rock using conventional rotary methods causes drill bits to wear, dull or break down rapidly after short drilled depths. This results in the need to regularly recover the failed drill bit to surface for replacement, adding significant project time and costs.

GeoVolve HAMMER uses a percussive drilling technique which is proven to speed up the drilling rate of penetration (ROP) in hard rock by up to 10 times or more. GeoVolve HAMMER's percussive drilling method is less damaging to the drill bit, meaning the bit can drill deeper for longer, further reducing equipment-related costs and boosting time efficiencies.

GeoVolve HAMMER is a simple plug-and-play system, compatible with any bottom hole assembly (BHA). It is fully configurable and does not interfere with measurement while drilling (MWD) or steerable systems, meaning it can be deployed without compromising the performance of the other downhole systems. This system is full-bore, does not induce pressure loss in the BHA, provides real time feedback on drilling performance and can also be deployed in oil and gas hard rock environments and Extended Reach Drilling (ERD) operations.

Dr Peter B Moyes, HydroVolve founder, said, "With GeoVolve HAMMER, we're transforming geothermal economics using oil and gas technology innovation and expertise. Where previous percussive drilling tools have lacked consistency and reliability, GeoVolve HAMMER has the capability to overcome all previously met challenges by providing resilience, longevity, and thermal capability."

HydroVolve is working closely with partners across the oil and gas and geothermal sectors to accelerate the development of GeoVolve HAMMER.

Fronius develops iWave, the intelligent TIG welding system

FRONIUS HAS DEVELOPED the iWave to enable the very best TIG weld quality and flawless results to be produced on different metals.

The innovative Option CycleTIG provides for maximum control over the arc and targeted heat input. Further highlights include improved ignition control and greater ease of use with intuitive operation. Whether welding pressure vessels, pipes or the most demanding requirements in medical technology and food and drink production – in fact, all applications where avoiding pores and temper coloration is critical – the iWave is the perfect choice. The series is available as of now in power categories 190 A to 500 A.

Image Credit: Fronius

The iWave combines a great TIG welding experience with maximum control and the ultimate in precision thanks to Fronius CycleTIG.

The new iWave proves its worth with sophisticated TIG technology and is ideally suited for manual metal arc welding – even with cellulose electrodes. The Multiprocess PRO option is a real winner, giving the user unlimited access to all MIG/MAG processes in power categories from 300 A. This makes the iWave a multi-talented all-rounder producing outstanding welding results with all welding processes.

RightShip's carbon accounting reporting tool to accelerate Scope 3 decarbonisation

RIGHTSHIP, ONE OF the leading third-party risk assessment and due diligence organisations serving the ship-borne commodities industries, has launched an expanded and enhanced toolset for monitoring, measuring and benchmarking shipping-related greenhouse gas (GHG) emissions.

RightShip's Carbon Accounting Reporting Tool builds on its existing expertise in 'carbon accounting', supplied to charterers as well as freight forwarders for the last five years, by providing companies with a bespoke reporting tool that measures, monitors and benchmarks a company's GHG emissions over defined periods.

This development in reporting technology comes at a time when bulk commodity producers throughout mining and oil and gas, freight forwarders, traders and investors are under growing pressure to demonstrate reductions in their Scope 3 emissions – of which shipping constitutes a major part. In fact, Scope 3 emissions constitute as much as 88% of oil and gas sector emissions, rising to 95% for the mining sector. This pressure comes from multiple directions, including regulators and governments, consumers via the supply-chain, and investors via more stringent environmental, social and governance (ESG) reporting and performance requirements.

MetCam optical gas detection camera visualises invisible gas hazards

DRAGER'S METCAM OPTICAL gas detection camera is set to identify and quantify methane leaks even under challenging conditions.

Potential hazards from escaping gases can thus be assessed more quickly and more precisely. Methane gas leaks are invisible, but even the smallest leaks can endanger the safety of an industrial plant and damage the environment.

In the oil and gas industry, there are often dense plant areas that are difficult to access with many potential leak sources. For such areas MetCam complements conventional point gas detection systems with area monitoring.

"The MetCam automatically monitors the plant around the clock and detects gas leaks at an early stage," explained John Wilson, senior vice-president of sales and marketing, safety solutions, Dräger.

In contrast to point detectors, the gas source does not have to be in the immediate vicinity of the gas camera. Its field of view is already sufficient to detect the escaping gas. The gas cloud is visualised as a coloured overlay on a black and white video image. In addition, the MetCam automatically quantifies the concentration of the escaping gas. It can also be used to measure emissions, or as a surveillance camera with a color image.

Image Credit: Dräger

The MetCam automatically detects when the optics are dirty or obscured and sends an appropriate warning to avoid false alarms.

Veolia Water Technologies launches Coafil deoiling technology

VEOLIA WATER TECHNOLOGIES has introduced the new deoiling technology CoaFil, for the treatment of produced water or oily wastewater in the oil and gas industry. CoaFil replaces two or three steps of the classic deoiling treatment process. It is designed for higher feed concentrations of oil and solids for very low discharges. CoaFil allows for higher oil and solids feeds while achieving very low discharge levels (less than one part per million (ppm)). The oleophobic media repels oil for an easier backwash and reduces the risk of 'mud-balling' for a better, consistent outlet quality.

As a single technology, CoaFil eliminates the need for conventional secondary and tertiary treatment steps such as the Induced Gas Flotation, nutshell filters and media/sand filters. With four models available, CoaFil is fully designed and standardised to the standards of the oil and gas industry, benefiting from Veolia Water Technologies' proven expertise. It is available as a vertical vessel with internal and media supply for single or series units based on feed and discharge requirements.

Image credit: Veolia Water Technologies

New deoiling technology CoaFil.

Intoware launches WorkfloPlus-Web for frontline oil workers

DIGITAL WORKFLOW LEADER Intoware has announced the launch of its next-generation SaaS digital work-instruction platform for web browsers, "WorkfloPlus-Web" designed to connect the oil frontline workforce. This new iteration enables oil and gas operators to quickly and easily transform paper-based procedures into smart digital workflows that are now accessible via a web browser, while opening up the platform to operating systems such as Microsoft Windows for seamless integrated working. This means procedures such as asset inspections can be carried out as a workflow, when completed data is passed in a formatted to satisfy a required system such as IBM Maximo and SAP, which in turns allows for documents to be extracted and converted to complete tasks. This workflow process integration led to digitalisation of more than 1,500 North Sea asset maintenance inspections, driving a 200 per cent increase in productivity for Intoware's client, Petrofac.

If systems aren't integrated via Open API's in this way, it means these processes can become complicated by the number of different applications that are involved to complete a single procedure.

Yokogawa enhances cybersecurity for OpreX control and safety system lineup

YOKOGAWA ELECTRIC CORPORATION has obtained ISASecure CSA Level 1 certification from the ISA Security Compliance Institute (ISCI) for its CENTUM VP integrated production control system, a product in the OpreX Control and Safety System family. With this certification, Yokogawa's CENTUM VP integrated production control system and ProSafe-RS safety instrumented system now both conform to the latest international security standards. In addition, the company has developed an enhanced version of ProSafe-RS Lite that meets both explosion protection and marine standards, and an updated version of the Plant Resource Manager (PRM) software that supports this latest version of the ProSafe-RS Lite.

Image credit: Adobe Stock

Cyberattacks on facilities are on the rise worldwide.

Due in part to factors such as the increased reliance on remote system access during the COVID-19 pandemic, cyberattacks on production facilities are on the rise worldwide, and this is driving a rising awareness of the need for compliance with international standards. Components that receive ISASecure CSA certification conform to the IEC 62443-4-1 and IEC 62443-4-2 international standards pertaining to security for industrial automation and control systems. With the development of highly secure and safe devices and systems, and the provision of support for their operation, Yokogawa is able to offer a wide range of control system solutions.

ZALUX release new high bay hazardous luminaire range

ZALUX, A LEADER in industrial lighting solutions, has announced the release of its new OREX high bay luminaires ATEX and IECEX certified for hazardous areas. Available in models for Ex Zone 1 (OREX 1) and Ex Zone 2 (OREX 2) and ideal for oil and gas or petrochemical applications, the luminaires give the right light quality and intensity needed for the highest of hazardous applications, while providing energy efficiency and robustness.

David Franch, director of sales, marketing, and product management at ZALUX, said, "OREX is the latest addition to our hazardous lighting ranges. It has been designed to withstand harsh industrial environments, provide exceptional lighting quality, and, using latest LED technology, optimise energy consumption. Made in Europe and based on 40 years of luminaire design experience, customers can be assured of excellent quality, reliability, performance and safety."

Image credit: Zalux

Zalux is a leader in industrial lighting solutions.

OREX luminaires are available with DALI control and provide luminous flux up to 40,500 lm at a remarkable efficiency of up to 150 lm/W. Constructed from high quality mechanical components, the units are suitable for installation outdoors and, with features including a huge temperature range from -32 ºC to 75 ºC, are designed to withstand heavy industrial environments. Housings are made in copper-free aluminium for use in hazardous areas and a tempered glass diffuser make them resistant to weather and harsh industry conditions.

The design of the OREX luminaires ensures easy installation. Both models are available with different installation accessories for pipe/tube or rotatable wall mounting and can be purchased preprepared for installation with a cable gland and cable (length from 0.25m to 3m) already connected, especially designed to be mounted on high poles with a junction box at the bottom of the pole.

Harnessing the power of data

Breakout company MapStand offers open source data on a global scale.

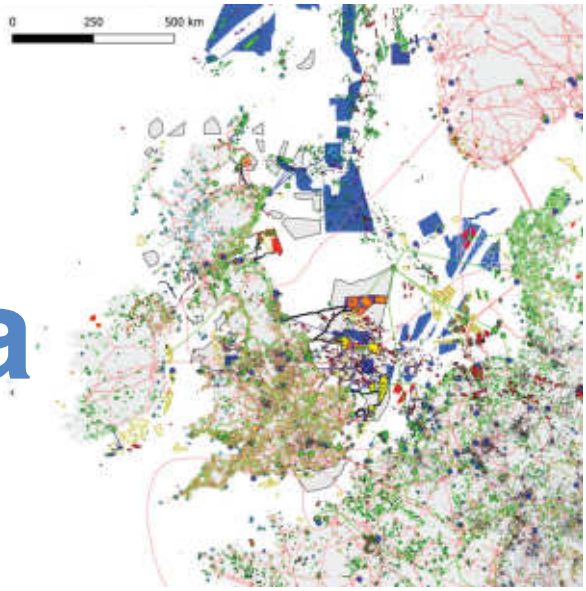

Image Credit : MapStand

A UK energy transition map created using MapStand data.

SPEAKING TO OIL Review Middle East, Isaac Kenyon, SpatialEnergy data analyst at MapStand, explained how his company is helping the oil and gas industry reap the benefits of data.

MapStand was created when Founder, Francis Cram, realised that while there were a lot of data providers available, all were very expensive and that all the free open source data was not together in one place. For many organisations it was therefore a nightmare finding easily accessible and affordable data to support their operations. With a view to changing this, Cram founded MapStand in order to build a product that brings in open source data from all around the world and make it available in one place so a range of companies can easily access and utilise it, without having to pay fortunes.

Kenyon explained, "Different data providers such as governments have different data portals and these are all separate. MapStand's aim was to combine all of these into one place with no border dividers which makes life a lot easier, especially in regions such as the North Sea where there are a lot of different countries performing different types of activities."

The MapStand Community online platform provides global data coverage and is free for anyone to sign up, view and explore data sets. The multi-layered search feature allows company asset summaries and country overviews for E&P, Renewable Energy and Infrastructure insights.

"We have a lot of people who are excited about the product and want to support it which they do so by providing feedback in areas where we might not necessarily have as much data. They offer data they have produced or can point us in the direction of where to obtain it. A lot is therefore crowd sourced and in some areas we also get a lot of relinquishment reports from certain government agencies etc which helps to map these areas and show potential explorations prospects and leads for users."

Products serving the industry

Aside from the MapStand Community Platform, the company also has two other main products which it has launched – the MapStand Hub and the MapStand Enterprise.

The Hub is a cloud-based web mapping area for clients which adds a lot more functionality such as collaborative real-time working within a online geospatial portal. "This is a geospatial workspace where you can pull in data sets, manipulate them and create dashboards. You can drill down on data sets, filter attributes and more. Through the Enterprise subscription we are able to distribute our data layers into other companies' software and through APIs people can tap into our data sets and bring our data into their own products," said Kenyon.

"The Newsfeed is a functionality of our app which may in the future turn into a product for users to get daily updated sources of activity and announcements from the energy industry. Platforms, infrastructure, etc in the database get tagged to the newsfeed and by clicking on these tags users will get taken to those objects on the map – allowing them to explore news in a different way."

> "One of our main ambitions is to promote collaboration and transparency."

Supporting the energy transition

Kenyon explained that the products aid oil and gas companies by providing up to date information on dispute management and territorial claims which is especially important when it comes to licences. However, MapStands solutions have been particularly useful in supporting the industry's fight against climate change.

Kenyon noted, "A lot of oil and gas companies are looking to get involved in the energy transition and re-positioning to become energy integrated companies. For them, having the combination of renewable power data sets with oil and gas data sets is very useful. We can help to highlight opportunities around carbon capture storage, building windfarms to support activities, electrifying platforms, etc."

Collaboration is key for driving this energy transition and indeed the company, Kenyon continued. "We want to scale up our energy transition collaborative efforts. Being able to work together to share data will help everyone reach their climate goals quicker and everyone will have an equal playing field know where things are and who is doing what/where. One of our main ambitions is to promote collaboration and transparency, especially around energy data."

In for the long-haul

Launching just before the dawn of Covid-19 was unfortunate timing, however MapStand adapted well, re-considered their goals and now have an eye for expansion in the future. "We had to scale back a bit on a lot of our ambitions but we have also pivoted and focused on the long-term to support the energy transition. In many ways the pandemic has helped drive this transition and we are looking to support this going forward. Our ambition now would be to scale up the data sets we provide," Kenyon remarked.

"We are also trying to improve our products for users and are constantly working on automation and making our processes a lot smoother. Finally, we want to continue to grow our community. The larger we grow in terms of cliental and the more people signed onto our platform app the better our data quality will be worldwide." ■

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bisn Performance Barrier Technologies

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Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS, EGYPT

Project Name	City	Facility	Budget (US$)	Status
MIDOR - Midor Refinery	Alexandria	Refinery	2,300,000,000	Construction
GASCO - Dahshur Gas Compression Expansion	Dahshur	Gas Compression	200,000,000	Construction
RSNRPC - Polypropylene (PP) Plant	Alexandria	Polypropylene	1,700,000,000	Feasibility Study
WAPHCO - El-Wady Complex for Phosphate and Compound Fertilizers	Abu Tartor	Phosphoric Acid, Ammonium, Phosphate	1,200,000,000	Engineering & Procurement
Kuwait Energy Egypt - Abu Sennan Concession - Infill Project	Western Desert	Oil Field Development	100,000,000	Construction
AGIBA - South West Meleiha Development Lease	Western Desert	Oil Field Development	269,000,000	Construction
Assiut Oil Refining (ASORC) - Assiut Atmospheric Distillation Unit	Asyut	Crude Oil Distillation Unit	3,820,000,000	Engineering & Procurement
Misr Methanol and Petrochemicals Company - Methanol Plant	Ain Soukhna	Petrochemical Plant	2,600,000,000	Feasibility Study
PhPC - Atoll Gas Field	Damietta	Offshore Gas Field	300,000,000	Construction
ANOPC- Hydrocracking Diesel Complex - Hydrocracker Complex	Asyut	Hydrocracker	2,800,000,000	Construction
Petro Shorouk - Zohr Gas Field Development	Mediterranean Sea	Offshore Gas Field	12,000,000,000	Construction
Burullus Gas Company - West Nile Delta Gas Field - Giza, Fayoum and Raven Fields	West Nile Delta	Offshore Gas Field Development	800,000,000	Construction
Red Sea National Refining and Petrochemicals Company - Ain Sokhna Petrochemical Complex	Ain Soukhna	Polyester, Polyethylene	7,500,000,000	EPC ITB
NCIC - Fertilizer Complex	Ain Soukhna	Calcium Ammonium Nitrate, Ammonia, Urea	800,000,000	Construction
SIDPEC - Propane Dehydration (PDH) Plant	Alexandria	Propylene	730,000,000	Feasibility Study
Energean - North El Amriya-North Idku Development - Subsea Tie-Back	Idku	Gas Field Development	235,000,000	Engineering & Procurement
EGAS - Dahshur Gas Compression Expansion	Dahshur	Gas Field Development, Gas Compression	175,000,000	Engineering & Procurement
ECHEM - El Alamein Petrochemical and Refinery Complex	New Alamein City	Petrochemical Plant	8,000,000,000	Feasibility Study
GASCO - Western Desert Gas Complex - Train D	Western Desert	Gas Production	100,000,000	Engineering & Procurement
Apex International Energy - South East Meleiha - Concession Exploration	Western Desert	Oil Field Development, Exploration	100,000,000	Feasibility Study
SOPC - Suez Refinery Expansion	Suez	Refinery	1,400,000,000	Engineering & Procurement
PETROBEL - Nooros Exploration Prospect (Abu Madi West)	Nile Delta	Offshore Gas Field	12,000,000,000	Construction
EPPC - Propane Dehydrogenation (PDH) and Polypropylene (PP) Complex	Port Said	Propane Dehydrogenation, Polypropylene	1,200,000,000	Engineering & Procurement
NOSPCO - Offshore North Sinai Concession - Kamose and Tao Field Development	North Sinai	Gas Field Development, Gas Exploration	95,000,000	Pre-FEED
ECHEM - SCZone Refinery & Petrochemicals Complex - Petroleum Refinery Project	Suez Canal Economic Zone (SCZone)	Petroleum Oil	3,000,000,000	FEED
ECHEM - SCZone Refinery & Petrochemicals Complex - Petrochemicals Complex	Suez Canal Economic Zone (SCZone)	Petrochemical Plant	3,200,000,000	Feasibility Study
Total - OLA Energy Egypt - Mex Petroleum Zone - Alexandria Petroleum Products Terminal (APPT)	Alexandria	Gasoil	200,000,000	Design
Eni - North El Hammad License - Bashrush Discovery	Nile Delta	Gas Field Development, Gas Exploration	200,000,000	Feasibility Study
Eni - Nour Gas Discovery	North Sinai	Gas Exploration	100,000,000	Feasibility Study
SUCO - Disouq Concession - Field Development	Disouq	Oil Field Development	100,000,000	Design
EGAS - Tina to Mit Nama Loop Gas Pipeline	Various	Gas Pipeline	150,000,000	Engineering & Procurement
EHC - Ain Sokhna Ammonium Nitrate Complex Expansion	Ain Soukhna	Ammonium Nitrate	600,000,000	Engineering & Procurement
SEMADCO - Ataka Suez Ammonia Plant	Ataka, Suez	Ammonia	600,000,000	Feasibility Study
GASCO - Raven Field to Western Desert Gas Complex	Various	Gas Pipeline	250,000,000	Engineering & Procurement
BP - Wintershall Dea - West Nile Delta (WND) Gas Development - Idku Onshore Gas Processing Terminal and Export Pipelines	Kafr El Sheikh	Gas Processing	500,000,000	Engineering & Procurement
Sokhna Refinery and Petrochemicals Company -	Ain Soukhna	Refinery	2,000,000,000	Engineering & Procurement
Ain Sokhna Greenfield Refinery Agiba - Western Desert Gas Processing Plant	Western Desert	Gas Processing	700,000,000	Construction

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The DNA for Success

Project Databank

Compiled by Data Media Systems

Project Focus

Compiled by Data Media Systems

MIDOR - Midor Refinery

Name of Client	MIDOR - Middle East Oil Refinery
Estimated Budget (US$)	2,300,000,000
Contract Value (US$)	1,700,000,000
Award Date	2015-Q3
Main contractor	ENPPI, Petrojet, Technip
Facility Type	Oil Refinery
Status	Commissioning
Location	Alexandria, Egypt
Project Start	2014-Q1
End Date	2022-Q4

Background

MIDOR (Middle East Oil Refinery) is planning to modernise and expand the Midor refinery near Alexandria, Egypt. The current refinery capacity is 100,000 barrels of crude oil a day (bopd). The expansion will be 160,000 bopd. The project will allow Egypt to cut its petroleum product imports and export refined oil products.

Project Status

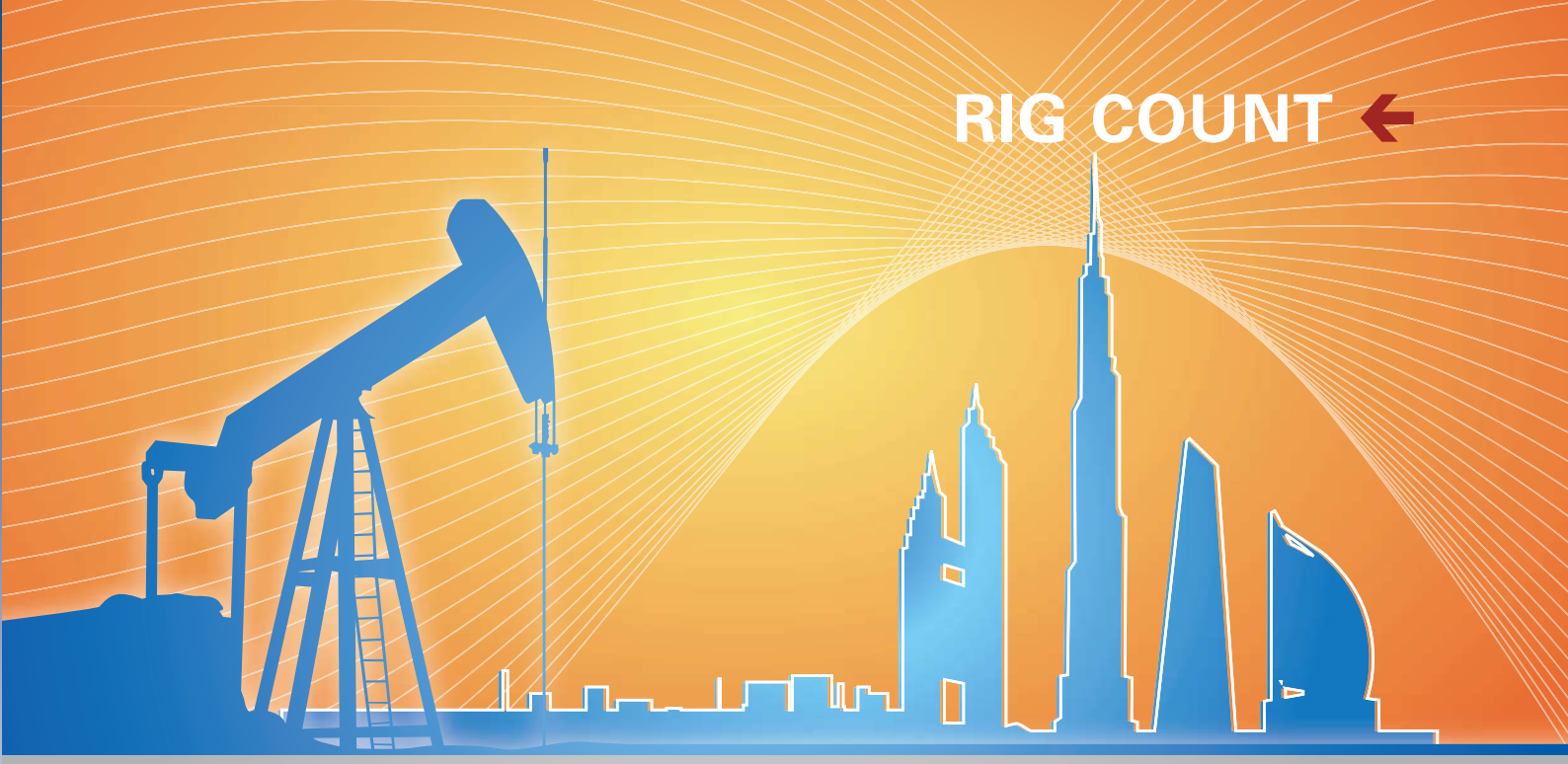
Date	Status
Jan 2022	The project will start producing EURO 5 diesel once modern and modified units enter the operational testing process in mid-2022.
Jan 2022	The trial operations work is expected to be completed in Q4 2022.
Jan 2022	80% of the project work has been completed.
Apr 2020	The project will be rescheduled due to the current circumstances of COVID-19.
Feb 2020	The construction work has been started.
Jul 2019	KNM Group has been awarded a US$8.7mn contract from Technip for design, detailed engineering, and fabrication services for air-cooler heat exchangers.
Jun 2019	Unidro has been awarded a contract to supply four packages to treat water and condensate for the refinery.
Nov 2018	ENPPI and Petrojet have signed a contract to participate in the expansion project.
Nov 2018	TechnipFMC is working with MIDOR to complete the remaining conditions precedent to enable project work to commence.

Project Scope

The scope of the project involves increasing the refinery capacity from 115,00 to 175,000 barrels of crude oil a day.

In addition, the refinery will be able to produce the following:

- 245,000 tons of butane gas
- 1.3 million tons of gasoline per year
- 3.2 million tons of diesel oil per year
- 570,000 tons of coal per year
- 135,000 tons of sulphur per year.



Middle East & North Africa

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

	DECEMBER 2021			VARIANCE	NOVEMBER 2021		
Country	Land	Offshore	Total	From Last Month	Land	Offshore	Total
Middle East							
ABU DHABI	31	11	42	-1	32	11	43
DUBAI	0	0	0	0	0	0	0
IRAQ	44	0	44	0	44	0	44
JORDAN	0	0	0	0	0	0	0
KUWAIT	25	0	25	-1	24	0	24
OMAN	46	0	46	+2	44	0	44
PAKISTAN	15	0	15	0	15	0	15
QATAR	2	8	10	-1	2	9	11
SAUDI ARABIA	56	9	65	+5	52	8	60
YEMEN	1	0	1	0	1	0	1
TOTAL	220	28	248	+6	214	28	242
North Africa							
ALGERIA	34	0	34	+3	31	0	31
EGYPT	23	7	30	+1	23	6	29
LIBYA	14	0	14	0	14	0	14
TUNISIA	2	0	2	0	2	0	2
TOTAL	73	7	80	+4	70	6	76

Source: Baker Hughes

من صفقة مرتبطة بأصل عالمي المستوى للبنية التحتية للغاز». ووصفها لاري فينك، رئيس «بلاك روك» ومديرها التنفيذي، بأنها «صفقة تاريخية» لقطاع البنية التحتية في المملكة. فيقول: «تتخذ أرامكو والمملكة خطوات هادفة واستشرافية لتحويل الاقتصاد السعودي نحو مصادر الطاقة المتجددة، والهيدروجين النظيف، ومستقبل خالٍ من الكربون، وللبنية التحتية للغاز الطبيعي المدارة بمسؤولية دور حيوي في هذا التحول».

الأمور تسير على ما كانت عليه

ولكن لم يتغير الوضع كثيرا من نواحٍ عدة بالنسبة لعملاقة النفط السعودي المملوكة للدولة. فقد حققت الشركة، عند الإعلان مؤخرا عن نتائج الربع الثالث لعام 2021، زيادة سنوية تبلغ 158 في المائة من صافي الدخل بمبلغ 30,4 مليار دولار، ويرجع ذلك ـ بالدرجة الأولى ـ إلى ارتفاع أسعار النفط الخام. وكما هي الحال دائما، تواصل «أرامكو» دعم اقتصاد المملكة المتطور من خلال إنتاجها المستدام للنفط والغاز من الحقول التي أمدت العالم بالطاقة طيلة عقود من الزمان. واستعرض الناصر بعض التحديات الاقتصادية التي تواجه الاقتصاد العالمي، ولا سيما اختناقات سلسلة الإمداد، لكنه ظل على تفاؤله بشكل عام حيال الطلب المستقبلي على الطاقة. كما تعهد بمواصلة العمل باستراتيجية الاستثمار طويل الأجل، مما يترتب عليه ـ حتما ـ الإقبال على تقنيات الطاقة الجديدة في إطار تحرك المملكة نحو التخلص من الكربون بحلول منتصف القرن. وبلغ إجمالي إنتاج النفط والغاز، خلال الربع الثالث من عام 2021، نحو 12,9 مليون برميل يوميا من المكافئ النفطي، بما يشمل إنتاج 9,5 ملايين برميل من النفط الخام في المتوسط يوميا. وخلال هذا الربع، وصل مشروع توسعة محطة غاز «الحوية»، في إطار برنامج زيادة إنتاج غاز «حرض»، إلى مراحل متقدمة من الإنشاء، ومن المتوقع أن يبدأ الإنتاج خلال العام الحالي.

وأبرمت المجموعة صفقة مالية لمحطة «سدير» للطاقة الشمسية الكهروضوئية بقدرة 1,5 جيجاوات خلال الربع الثالث، تمتلك فيها «أرامكو السعودية للطاقة» (سابكو) ـ التابعة لها ـ حصة تبلغ 30 في المائة. ولسوف تكون واحدة من أكبر محطات الطاقة الشمسية في المنطقة. ومن المتوقع أن تبدأ المرحلة الأولى لإنتاج الكهرباء خلال النصف الأخير من العام الجاري. وتمثل مشاركة «أرامكو» في هذا المشروع مشاركتها الأولى في حملة الطاقة المتجددة التي يقوم بها صندوق الاستثمارات العامة، مما يعكس جهودها لمواصلة التقدم نحو حلول الطاقة المستدامة؛ ذلك أن هذه الحلول من المحتمل أن تغدو من أبرز اتجاهات الطاقة خلال السنوات المقبلة. ومن الأطراف المعنية بهذا المشروع شركة «أكوا باور» وكذلك «الشركة القابضة للماء والكهرباء» (بديل)، إحدى الشركات المملوكة لصندوق الاستثمار العام.

الاستثمارات الصناعية

من السبل الأخرى لخطط «أرامكو» للنمو والتحول والتنوع، التحرك لتوسيع قاعدتها الصناعية. وقد أكدت ـ بالفعل ـ تحقيق توسع كبير في برنامج الاستثمارات الصناعية الخاص بها؛ أي برنامج «نماءات أرامكو»، وذلك من خلال توقيع 22 مذكرة تفاهم جديدة واتفاقية مشروع مشترك. وتركز هذه المبادرة على بناء القدرات في أربعة قطاعات رئيسية؛ الاستدامة، والتقنية، والخدمات الصناعية والطاقة، والمواد المتقدمة. وغايتها الحرص على تعزيز موثوقية إمدادات الطاقة، وتوطين سلسلة الإمداد الصناعية بفاعلية، وتطبيق مفاهيم اقتصاد الكربون الدائري. وتكمل مبادرة «نماءات» خطة الشركة الرائدة للتوطين، أي برنامج «القيمة المضافة الإجمالية لقطاع التوريد» (اكتفاء)، بالإضافة إلى مبادرة «شريك» الحكومية.

وقد تعاونت «أرامكو» في صفقة أخرى مع التكتل التجاري الهندي «لارسن آند توبرو» لتطوير قدرات التصنيع في المملكة بما يتماشى مع مبادرة «نماءات». ومن شأن هذا التعاون دعم جهود «لارسن آند توبرو» لإنشاء أول منشأة لتصنيع وحدات وأوعية ذات ضغط عالٍ في المنطقة، وذلك في مدينة الجبيل الصناعية. وستنتج هذه المنشأة معدات حيوية للعديد من الصناعات، مثل قطاعي الطاقة والنفط والغاز. ومن المقرر أن تبدأ «لارسن آند توبرو» في تشييد المنشأة الجديدة قريبا. ومن المتوقع أن يبدأ الإنتاج بحلول الربع الثالث من هذا العام.

ومن أمثلة الصفقات الأخرى، توقيع مذكرة تفاهم مع شركة «إير ليكويد» لدراسة إنتاج الهيدروجين منخفض الكربون والأمونيا، فضلا عن فرص استخلاص الكربون، ومذكرة أخرى مع شركة «ألتيا» لتطوير قدرات تفسير ومعالجة الصور الجغرافية المكانية المتقدمة المدعومة بالذكاء الاصطناعي داخل المملكة.

الغاز غير التقليدي

طالت يد التغيير حقول النفط والغاز الشاسعة في صحاري المملكة هي الأخرى، وراحت تسير نحو آفاق جديدة، بما في ذلك المواد الهيدروكربونية غير التقليدية. فقد طرحت «أرامكو» مؤخرا مناقصة وأرست عقودا بقيمة 10 مليارات دولار للبدء في تطوير حقل «الجافورة» العملاق للغاز غير التقليدي، وهو أكبر حقل غاز غير مصاحب في المملكة.

وهذه علامة فارقة على صعيد التسويق التجاري لموارد الغاز غير التقليدية في المملكة، وعلى صعيد التوسع في محفظة «أرامكو» لأعمال الغاز المتكاملة. ففي ظل وجود ما يقدر بنحو 200 تريليون قدم مكعب قياسي من الغاز في باطن الأرض، يحتوي حوض «الجافورة» على أكبر مخزون للغاز الصخري الغني بالسوائل في الشرق الأوسط. وهذا مشروع ضخم، ومن المتوقع أن تصل النفقات الرأسمالية في «الجافورة» إلى 68 مليار دولار خلال السنوات العشر الأولى من أعمال التطوير.

ووصفها الناصر بأنها «لحظة تاريخية» لها أثر ملموس على أمن الطاقة والتنمية الاقتصادية في المملكة على المدى الطويل. وقال إن غاز «الجافورة»: «سيساعد بشكل كبير في تقليل انبعاثات قطاع الطاقة في البلاد، وسوف تستخدم «أرامكو السعودية» المزيد من النفط الخام في تطبيقات عالية القيمة. وكذلك استخدام غاز «الجافورة» لقيماً لإنتاج الهيدروجين منخفض الكربون والأمونيا».

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28 ـ 29	مؤتمر الشرق الأوسط للتدخل في آبار النفط البحرية	أبوظبي	www.offsnet.com

«أرامكو» ترى الغاز يلعب دوراً رئيسيا في تحول الطاقة

أرامكو تتأهب لتحول الطاقة

في هذا المقال، يقول مارتن كلارك إن تغير العالم يستدعي تغير الشركة، وهكذا تتأهب «أرامكو» لمواجهة كافة التحديات التي تعترض عملية التحول التي يشهدها قطاع الطاقة مواجهة مباشرة. إذ تجتهد «أرامكو»، وهي أكبر شركة منتجة للنفط، فيما يجتهد العالم، لمواكبة تحول الطاقة وتحديات التخلص من الانبعاثات الكربونية. ولطالما كانت أبرز شركة في المملكة رائدة في تطوير قطاع النفط والغاز، ووقفت داعمة لإمدادات النفط العالمية في الأوقات العصيبة. لكنها تعمل كذلك على استكشاف خياراتها طويلة الأجل في ظل هيمنة مخاوف تغير المناخ على المشهد.

فقد وقعت «أرامكو»، في بداية ديسمبر/كانون الأول الماضي، اتفاقيات مع عدد من الشركات الفرنسية في مجالات تتراوح من استخلاص الكربون إلى المركبات التي تعمل بالهيدروجين. ومن الجلي أن هذه فترة تغيير بالنسبة للجميع. والحق أن عملاقة النفط المملوكة للدولة هذه قدمت لمحة عما يمكننا توقعه من خلال طرحها العام الأولي الذي حقق نجاحا كبيرا قبل عامين. إذ جمعت خلاله 30 مليار دولار أمريكي من المستثمرين في حدث كان يبدو مستبعدا منذ فترة ليست بالبعيدة، وكان إيذانا ببداية حقبة جديدة لعملاقة النفط هذه.

البنية التحتية للطاقة

لا تزال «أرامكو» تؤيد التعاون مع المستثمرين العالميين بشدة، وذلك في ظل حرصها على الاستفادة من قاعدة بنيتها التحتية الشاسعة التي تغطي كل ركن من أركان قطاع الطاقة في المملكة؛ من مرحلة الإنتاج إلى مرحلة البيع. وفي أحدث مثال على ذلك، وقعت شركة «بلاك روك ريال أسيتس» وشركة «حصانة الاستثمارية»، المدعومة من الدولة، صفقة إيجار وتأجير بقيمة 15,5 مليار دولار لشبكة خطوط أنابيب الغاز التي تملكها «أرامكو» في ديسمبر/كانون الأول 2021.

ومن المقرر أن يؤسس الشركاء الثلاثة شركة جديدة، وهي شركة «أرامكو لأنابيب الغاز»، ستحصّل تعريفة مستحقة على غاز «أرامكو» الذي يتدفق عبر الشبكة على مدار 20 عاما. ولا تزال «أرامكو» تحتفظ بملكيتها الكاملة للشبكة وتحكمها في تشغيلها. وتأتي هذه الصفقة على إثر صفقة منفصلة بقيمة 12,4 مليار دولار في وقت سابق من عام 2021، ببيع نسبة 49 في المائة من خطوط أنابيب النفط التي تملكها «أرامكو» لاتحاد تجاري بقيادة شركة «إي آي جي»، التي يوجد مقرها بالولايات المتحدة، وذلك بموجب شروط مماثلة. وتسلط هاتان الصفقتان ـ معا ـ الضوء على الجاذبية المستمرة للبنية التحتية للطاقة التي تمتلكها «أرامكو» للمستثمرين العالميين.

وصرح المهندس أمين الناصر، رئيس «أرامكو» ومديرها التنفيذي، بأن صفقة شبكة الغاز تمثل كذلك أكبر صفقة بنية تحتية للطاقة في المنطقة حتى الآن، وتسلط الضوء على أهمية الغاز الطبيعي خلال مرحلة تحول الطاقة.

ويقول: «مع توقع أن يلعب الغاز دورا رئيسيا في التحول العالمي إلى مستقبل أكثر استدامة للطاقة، سيستفيد شركاؤنا

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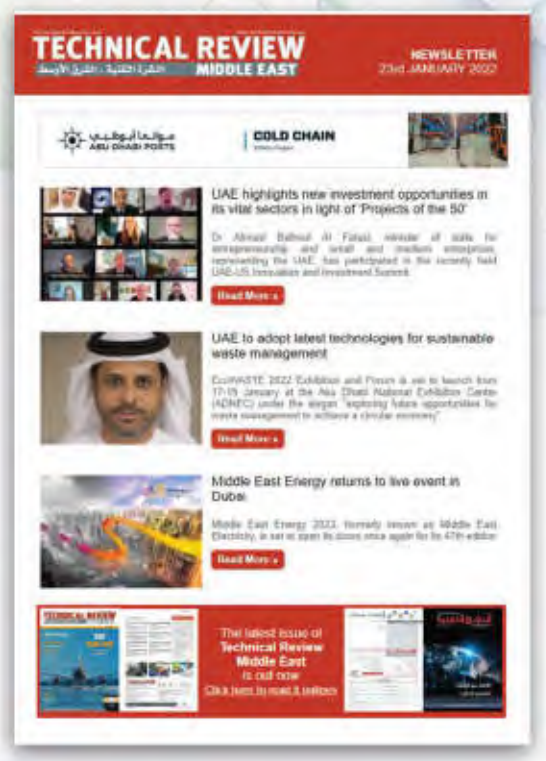

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الشرق الأوسط

المجلد 25 العدد الأول 2022

أرامكو تتأهب لتحول الطاقة

تغير العالم يستدعي تغير الشركة، وهكذا تتأهب «أرامكو» لمواجهة كافة التحديات التي تعترض عملية التحول