

# Oil Review

Oil · Gas · Petrochemicals

Middle East

VOLUME 24 | ISSUE 8 2021

## Aramco gears up for a low-carbon energy future

- ADIPEC Review
- Digital twins for sustainable, productive and efficient processes
- Improving the performance of wet-gas flow meters
- Tapping into the hydrogen goldmine
- SOGAT: showcasing sour gas management technologies

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**Printed by:** Buxton Press

**Printed in:** December 2021

© Oil Review Middle East ISSN: 1464-9314

## → Editor's note

IF ADIPEC IS a barometer for the global oil and gas industry, the outlook is certainly looking up. This year's show had a very positive vibe, with many delegates commenting favourably on the flow of visitors and the level of serious enquiries. The opportunity to meet face-to-face again was greatly appreciated. Following hard on the heels of COP26, the event had sustainability and decarbonisation at the heart of discussions, with many companies showcasing their sustainable solutions. See our ADIPEC Review on p18 for reports on the show and interviews with exhibitors.

Elsewhere, we look at how Aramco is gearing up to meet the challenges of the energy transition (p14), improving the performance of wet-gas flow meters (p32) and the role of digital twins and other digital tools in helping companies create efficient, sustainable and productive processes (p42).

It just remains for me to wish all our readers and supporters the very best for the festive season, and a happy and prosperous New Year.

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Front cover image: Aramco

Back cover image: Adobe Stock

## → Executives' Calendar, 2022

JANUARY			
16-18	<b>Intersec</b>	DUBAI	<a href="http://www.intersec.ae.messefrankfurt.com">www.intersec.ae.messefrankfurt.com</a>
17-19	<b>World Future Energy Summit</b>	ABU DHABI	<a href="http://www.worldfutureenergysummit.com">www.worldfutureenergysummit.com</a>
23-25	<b>SOGAT</b>	ABU DHABI	<a href="http://www.sogat.org">www.sogat.org</a>
24-25	<b>Middle East Petroleum &amp; Gas Conference</b>	MANAMA	<a href="http://www.mpgc.cc">www.mpgc.cc</a>
FEBRUARY			
1-4	<b>Offshore Europe</b>	ABERDEEN	<a href="http://www.offshore-europe.co.uk">www.offshore-europe.co.uk</a>
14-17	<b>Me-tech 2022</b>	DUBAI	<a href="http://www.europetro.com/event/380">www.europetro.com/event/380</a>
14-16	<b>Egyps</b>	CAIRO	<a href="http://www.egyps.com">www.egyps.com</a>
21-23	<b>Int'l Petroleum Technology Conference (IPTC)</b>	DHAHRAN	<a href="http://www.iptcnet.org">www.iptcnet.org</a>
22-24	<b>International Energy Week</b>	LONDON	<a href="http://www.ieweek.co.uk">www.ieweek.co.uk</a>
MARCH			
7-9	<b>Middle East Energy</b>	DUBAI	<a href="http://www.middleeast-energy.com">www.middleeast-energy.com</a>
16-17	<b>MENA HSE Forum</b>	DUBAI	<a href="http://www.hse-forum.com/mena">www.hse-forum.com/mena</a>
21-23	<b>Oman Petroleum &amp; Energy Show</b>	MUSCAT	<a href="http://www.omanpetroleumandenergyshow.com">www.omanpetroleumandenergyshow.com</a>
28-29	<b>Offshore Well Intervention Middle East</b>	ABU DHABI	<a href="http://www.offsnets.com">www.offsnets.com</a>

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

### OWI ME 2022 to bring the well intervention community together face-to-face

THE MIDDLE EAST'S leading well intervention conference is back on the 28-29 March in Abu Dhabi, UAE! After last year's virtual event, the well intervention community is keen to reunite face-to-face, and OWI ME 2022 is the place to do just that. This is a unique opportunity for you to network with the Middle East's leading operators and position yourself as a prominent service provider within the industry.

#### What you can expect from OWI ME 2022:

- Unique networking opportunities – with speakers from ADNOC, Aramco, BP, and more already lined up, OWI ME 2022 is the place to interact with the Middle East's leading operators
- New technologies – explore our newly designed technology showcase hall, with exhibitions from DTI and MADCON, providing you with access to the latest technologies and services
- Plug & Abandonment case studies – discover the current status of

the decommissioning industry in the Middle East, including a 100-well case study from Dragon Oil

With the number of well intervention campaigns set to increase in the next few years, it is imperative you are up to date on the latest best practices to ensure you are optimising your 2022 projects.

**To find out more, download the brochure here:**  
<https://offsnets.com/owi-me/conference-brochure>

*For any questions and for speaking and sponsorship opportunities, please reach out to Rachael on the details below.*

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*OWI ME 2022 will take place in Abu Dhabi.*



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# Showcasing the latest technologies in sour gas management

The Sour Oil & Gas Technology conference and exhibition (SOGAT) returns to Abu Dhabi from 23-25 January 2022 as an in-person event.

**N**ATURAL GAS CONSUMPTION continues to rise, and is one of the preferred energy sources, as it reduces the carbon footprint while meeting demand. The Gulf's gas resources are predominantly sour, with high percentages of H<sub>2</sub>S and CO<sub>2</sub>, requiring stringent conditioning before infrastructure usage. In turn, the processing of the contaminated resources adds to carbon management concerns.

These issues, and the decarbonisation developments to address them, are central themes of the in-person SOGAT 2022 conference and exhibition. For example, it has been reported that ADNOC's Shah gas plant has the potential to capture 2.3mn tonnes per/year of CO<sub>2</sub> and their Habshan and Bab plants almost two million tonnes of CO<sub>2</sub> per/year. In fact by 2030, ADNOC aims to expand its CCUS capacity by 500%, capturing five million tonnes of CO<sub>2</sub> per year.

Carbon capture technology is vital internationally, as CO<sub>2</sub> emissions need to decrease by 50% to achieve global climate goals. So the conference presentations on CCUS benefits will contribute to these objectives, and the paper from Comprimo on CO<sub>2</sub> capture from a gas stream in processing plants and its technology selection options, will be of particular interest. Similarly,



Image Credit: Dome Exhibitions

**SOGAT 2022 will provide a forum to discuss the latest sour gas processing and treatment technologies.**

presentations from Rate on a new process combining membranes with liquefaction, providing significant advantages in CO<sub>2</sub> removal from natural gas, and a novel approach from Saudi Aramco for simultaneous acid gas enrichment and CO<sub>2</sub> capture, where the new process combines membrane and amine technologies to achieve unprecedented levels of H<sub>2</sub>S enrichment and efficient CO<sub>2</sub> capture, will be well received.

One of the main highlights of the SOGAT 2022 conference is the presentation by Thiozen Inc. on a new chemical cycle producing hydrogen from H<sub>2</sub>S. Their multi-step chemical cycle for sour natural gas processing is scheduled to pilot in 2022, and details of the technology offering, development timeline, and further commercialisation details will be presented.

In the associated exhibition, Shell will demonstrate their range of process technologies that help gas producers to cost effectively, reliably and safely get their sour gas to pipeline and LNG specifications, as well as reduce the carbon intensity of existing

and future operations. These demonstrations will complement their conference presentation. It is a similar case for Himla, who are exhibiting for the first time and will be talking about digitalising the safety lifecycle in sour gas applications with a TÜV-certified software platform that digitalises the verification process, enabling the owner to drive down CAPEX and OPEX.

Another first is DSF, who will present and exhibit their new SRU refractory that addresses the importance of creep resistance and how their hot face refractory has been redesigned to reduce increasing creep problems in SRUs.

Other technical problems with SRUs will be covered in the free to attend pre-conference workshop, thus making SOGAT 2022 not only a one-stop shop to learn about and debate the latest findings in sour processing management, but also the event to facilitate onsite business. ■

Full details of SOGAT 2022 can be found at [www.sogat.org](http://www.sogat.org)

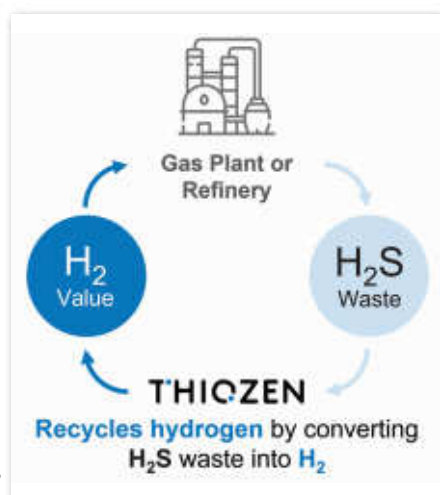


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## Cyber security and technology in the spotlight at Intersec 2022

INTERSEC, THE EMERGENCY services, security, and safety event, will take place from 16-18 January 2022 at Dubai World Trade Center, with the theme of 'Uniting the world's leading industry specialists for the safety and security of future generations'.

The event will see cybersecurity and technology take centre stage with its first ever cyber lab offering a vital platform for knowledge. The inaugural Cyber Security Lab conference will welcome ethical hacker, Freaky Clown (FC) for the first time in the Middle East as a headline speaker at the event who will give deep insights into the world of cybercrime. FC will talk about how cyber criminals circumnavigate access controls, how governments and organisations can identify their cyber weaknesses and what they can do to improve their security.

Intersec's Cyber Security Lab, under the theme 'Into the unknown', will focus on cybercrime, building cyber resilience, cyber threats, infrastructure investment, national security and international cooperation. It has been developed through a strategic partnership between Intersec and the UAE Cyber Security Council, which sets out to strengthen cybersecurity in the UAE and improve co-ordination and response times to potential attacks.

The Cyber Security Lab is one of six Intersec conferences which will feature hard-hitting discussions featuring global leaders debating, and exchanging perspectives on challenges, strategic initiatives and cooperation to foster safety and security of all. The full programme features over 500 speakers – the largest conference platform for the sector on a world-class stage.

Alex Nicholl, Messe Frankfurt Middle East's head of Intersec said, "Intersec's commitment to bringing the brightest, most qualified experts to the stage in 2022 is exemplified by the attendance of FC.



Image credit: Messe Frankfurt

The event will see cybersecurity and technology take centre stage with its first ever cyber lab offering a vital platform for knowledge.

Perhaps more than most, he understands how cyber criminals think, how they operate and what tools they use to beat security controls. We are incredibly excited to hear what he has to say at Intersec 2022."

Intersec is held under the patronage of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai. Official supporters include Dubai Police, Dubai Civil Defence, Security Industry Regulatory Agency (SIRA), the UAE Cyber Security Council and Dubai Municipality.

For more information please visit: [www.intersecexpo.com](http://www.intersecexpo.com)

## World Future Energy Summit to showcase clean energy innovations

THE WORLD FUTURE Energy Summit will be held between 17-19 January 2022 at the Abu Dhabi National Exhibition Centre (ADNEC) as part of Abu Dhabi Sustainability Week, the sustainability-focused global platform hosted by Abu Dhabi Future Energy Company 'Masdar'. The summit will host innovations from around the world, as well as international technology pavilions from Germany, Switzerland, Italy, Netherlands, France, Austria, Nigeria, India, Japan, Korea and China.

### Perfect timing

The summit is perfectly timed, especially as the GCC begins to diversify its energy mix and a regional charge on use of renewable energy sources. In the region, more countries have committed to building major infrastructure projects that significantly reduce reliance on fossil fuels.

In Oman, plans are underway to build a US\$30bn plant that will be the world's largest green hydrogen production facility at its completion. The

plant is expected to be at full capacity in 2038, powered by 25GW of wind and solar energy. Further north, Saudi Arabia's Neom is the site to an equally proactive effort in the race for green hydrogen production, as Air Products and its partners work to deliver a US\$7bn renewable energy-powered green hydrogen-based ammonia production facility by 2025. The United States plans to invest an additional US\$550bn in clean energy, with China having already issued green bonds with a value of US\$154.7bn. In the UAE, Masdar aims to develop with its partners Siemens Energy and Marubeni, a green hydrogen demonstrator plant at Masdar City. In Dubai, the first solar-driven green hydrogen production facility in the MENA region has already been inaugurated, with a total investment of US\$11mn.

### The importance of the Energy Expo & Forum

As the centrepiece of the World Future Energy Summit 2021, the Energy Expo will be vital in accelerating this already fast-paced industry. It will host some of the biggest names in renewable energy, including Taqa, EDF, Engie and EWEC as exhibitors. The Solar & Clean Energy Forum will host industry leaders as speakers and panellists, including Bruce Stedall, asset management director of Transco, Dr Emmanouil Kakaras, executive vice-president Next Energy Business at Mitsubishi Heavy Industries EMEA, Mothana Bahjeat Qteisha, senior managing director, MEA & APAC, Jinko Solar amongst others.

Mohamed AlNowais, managing director of AMEA Power, a key exhibitor at the World Future Energy Summit said, "The future of energy is no longer an ambition: it is an urgent imperative. WFES Abu Dhabi has been for years the venue of choice for top industry professionals, and we are exceptionally excited to be there in person again."

On a similar note, Energy Systems CEO of DNV, Ditlev Engel, said, "The world needs to make this a decade of deep decarbonisation, overcoming the urgent and complex challenge of transitioning to a clean-energy system."



Image credit: WFES

World Future Energy Summit.



## Omicron could cost oil demand almost three million bpd in Q1 2022

THE OMICRON VARIANT of Covid-19 could cost the global oil market as much as 2.9mn barrels per day (bpd) of demand in the first quarter of 2022, bringing total expected demand down from 98.6mn bpd to 95.7mn bpd, if it triggers more lockdowns or restrictions, according to Rystad Energy.

If the variant spreads rapidly, causing a rise in Covid cases and the reintroduction of lockdowns, Rystad Energy predicts that oil

demand could fall from an expected 99.1mn bpd to 97.8mn bpd in December 2021 alone – a drop of 1.3mn bpd. Demand could tumble further in January 2022, shedding 4.2 mn bpd to a level of 94.2mn bpd.

As countries and governments learn to live with Omicron, or vaccine manufacturers adapt existing shots to counter the variant, the full-year impact will likely be less severe. Average 2022 demand would fall to 98mn bpd, a drop

of 2.1mn bpd against Rystad's current base case – or 'mean' – scenario.

In late November, oil demand growth was so strong that even a co-ordinated strategic petroleum reserve release from major oil-importing countries did nothing to quell bullishness surrounding oil prices. However, after governments went on high alert, the price of oil later collapsed by more than 10% as the demand downside is vastly different.

## Middle East energy professionals seek improved reward packages

ALMOST HALF OF all energy workers in the Middle East are considering leaving the energy industry within the next five years, according to research from the global energy recruitment specialists Oilandgasjobsearch.com and Brunel.

Image credit: Oilandgasjobsearch.com



*Retaining existing skillsets has never been so important given the impact the pandemic has had on the energy workforce.*

In a survey of nearly 17,000 energy professionals worldwide, 47% of respondents in the Middle East said they were thinking about moving out of the industry. This was the highest figure in the world and contrasts with a global average of 43%.


A further 22% of Middle East energy professionals said they were unsure about whether they wished to remain in the industry.

Among workers in the Middle East, the most common reason for planning to leave the sector was low salary, mentioned by 31% of respondents. This was followed by lack of good benefits – 25% – and personal lifestyle changes, cited by 22%.

As a global comparison, low salary was raised as a key issue by 25% of workers who were planning to exit from the industry. Personal lifestyle changes were also mentioned by 25% of respondents.

Lack of good benefits, mentioned in 22% of responses, was the third-most common reason for workers worldwide to be considering their futures within the industry.

Addressing recruitment challenges, 42% of recruiter responses from the Middle East identified inadequate succession planning for knowledge transfer as the key driver of skills shortages.





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## Aramco announces collaboration with French companies

THE SAUDI ARABIAN Oil Company has announced the signing of five agreements with leading French companies, including an agreement to explore a hydrogen-powered vehicle business with Gaussin, a pioneer in clean and intelligent transport solutions.

“This partnership is a continuation of Aramco’s long-standing relationship with a number of leading French companies. It represents an opportunity to promote hydrogen as a low-carbon solution, not just for motorsport, but eventually for mass transportation as well. Such collaboration helps us to advance economic growth in the Kingdom as part of the Namaat industrial investment programme and takes us a step closer to our shared vision of a more sustainable future,” commented Amin H Nasser, president and CEO of Aramco.

The agreement between Aramco and Gaussin aims to establish a modern manufacturing facility for on-road and off-road hydrogen powered vehicles in the Kingdom of Saudi Arabia. As a first step, Gaussin and Aramco will study the feasibility of a manufacturing facility and a hydrogen distribution business to serve the Middle East region.



*Aramco is sponsoring the first hydrogen-fuelled truck to compete in the Dakar Rally.*

Image credit: Aramco

## Digital oilfield technologies growing

OIL MAJORS ARE looking to automate their assets to reduce the impact of demand fluctuation on revenues, according to GlobalData. The leading data and analytics company notes that COVID-19 has been a wake-up call to the upheaval that a sudden drop in energy demand or labour availability can cause, and digital oilfield technologies such as digital twins and other remote monitoring solutions will be gamechangers in upstream oil and gas operations.

Charlotte Newton, analyst on the thematic research team at GlobalData, commented, “Technologies such as digital twins have the potential to be the backbone of digitalisation in the sector. By creating 3D images and simulations of assets, systems, and processes, oil companies can imagine more sophisticated, and more reliable, machinery in oilfields both now and in the near future.”

Ravindra Puranik, Oil & Gas analyst at GlobalData, added, “Companies are now looking to automate as many processes as possible to mitigate future operational risks. This is demonstrated by the fact that contracts activity relating to digitalisation in the upstream remained resilient in the last two years, despite the pandemic-led industry downturn.”

## Borouge awards EPC contracts

BOROUGE, A LEADING petrochemical company providing innovative, value-creating polyolefin solutions, has announced the award of the Engineering, Procurement and Construction (EPC) contracts for the world-scale fourth expansion of its manufacturing complex in Ruwais, Abu Dhabi. ADNOC and Borealis AG recently signed a strategic partnership that confirms a US\$6.2bn investment agreement to build Borouge 4.

The EPC award underscores Borouge’s drive to unlock opportunities in polyolefin manufacturing, enable industrial growth, and maximise the value of every barrel produced in the Emirate of Abu Dhabi. With this expansion, Borouge will become the world’s largest single-site polyolefin complex. The facility will also enable the next phase of growth at the Ruwais Industrial Complex by supplying feedstock to the TA’ZIZ Industrial Chemicals Zone.

Borouge undertook a front-end engineering design (FEED) and a competitive tender process; as part of the process leading up to the EPC awards. The scope of the award covers engineering, procurement, construction, and commissioning activities for the polyolefin complex facilities required to facilitate the full production capacity of two new polyethylene plants, each with a capacity of

700,000 tonnes per annum, using the third generation of Borealis Borstar technology. These plants will be supplied by a world-scale ethane cracker with capacity of more than 1.5 million tonnes per annum of ethylene.

*EPC contracts have been awarded for the Borouge 4 expansion.*



Image credit: Borouge

## AIQ and Baker Hughes partner to develop advanced analytics solutions

AIQ, THE ABU DHABI National Oil Company’s (ADNOC) artificial intelligence (AI) joint venture with Group 42 (G42), and Baker Hughes, an energy technology company, have announced a strategic collaboration agreement to develop advanced analytics solutions for the global oil and gas industry.

The announcement was made at the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) and will see AIQ and Baker Hughes collaborate on the development and commercialisation of AI products for improved efficiency of upstream oil and gas operations.



Image credit: Baker Hughes

*Initial work will focus on developing AI solutions that will optimise ADNOC’s drilling performance.*

With drilling being a capital-intensive process, the initial project work will focus on developing AI solutions, analysing drilling data and identifying opportunities for improved drilling trajectories and programmes for ADNOC, utilising existing Baker Hughes digital products. The project supports ADNOC’s plans to efficiently ramp up drilling activities as it boosts its crude production capacity to five million barrels per day by 2030 and enables gas self-sufficiency for the United Arab Emirates (UAE).

The collaboration will combine the diverse digital expertise and technology portfolio of Baker Hughes with the data science proficiency of AIQ.

The collaboration agreement brings together Baker Hughes’ digital and technological experts with AIQ’s world-class data scientists, AI experts and software developers. Together they will work on the development, deployment, and commercialisation of AI products to customers in the oil and gas industry.

Launched in 2020, AIQ is working on a number of key AI projects across the oil and gas value chain such as drilling performance, reservoir modelling, corrosion detection, and product quality.



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## Weatherford awarded digital oilfield project in Kuwait

WEATHERFORD INTERNATIONAL has been awarded a three-year digital oilfield contract from Kuwait Oil Company (KOC), aiming to support its digital transformation strategy in North Kuwait Heavy Oil field and deploying its Integrated Enterprise Excellence Platform across KOC. The award also includes instrumentation, real-time monitoring and production optimisation and assurance of wells to enable KOC to optimise its production and workover plans.

The project scope will support KOC in performing heavy oil wells analysis, model tuning, well design, asset optimisation, surveillance and forecasting, and integrating with different E&P applications. Weatherford will also deploy integrated planning and optimisation solutions from the reservoir to export facilities at KOC's corporate level. Leveraging advanced analytics, artificial intelligence and machine learning, the platform synthesises data from across the operator's business to help find and prioritise production-uplift opportunities, identify bottlenecks, detect and predict failures, plan and execute workovers.

*The contract will support KOC's digital transformation strategy.*



Image credit: Adobe Stock

## Abu Dhabi powerhouse for clean energy launched

HH SHEIKH MOHAMED bin Zayed Al Nahyan, crown prince of Abu Dhabi and deputy supreme commander of the UAE Armed Forces announced a global clean energy powerhouse intended to spearhead the drive to net-zero carbon by 2050. Consolidating their combined efforts in renewable energy and green hydrogen, Abu Dhabi National Energy Company PJSC (TAQA), Mubadala Investment Company (Mubadala) and Abu Dhabi National Oil Company (ADNOC) will partner under the Abu Dhabi Future Energy Company (Masdar) brand.

The agreement was signed in the UAE Pavilion at EXPO 2020 and was witnessed by HH Sheikh Mohamed bin Zayed, along with HH Sheikh Hazza bin Zayed Al Nahyan; HH Sheikh Mansour bin Zayed Al Nahyan; HH Sheikh Khaled bin Mohamed bin Zayed Al Nahyan; and HH Sheikh Theyab bin Mohamed bin Zayed Al Nahyan. Signatories were HE Dr. Sultan Ahmed Al Jaber, UAE minister of Industry and Advanced Technology and ADNOC managing director and group CEO; HE Khaldoon Khalifa Al Mubarak, managing director and group CEO of Mubadala; and HE Mohamed Hassan Alsuwaidi, CEO of ADQ and chairman of TAQA.

The partnership between three Abu Dhabi champions will have a combined current, committed, and exclusive capacity of over 23GW of renewable energy, with the expectation of reaching well over 50GW total capacity by 2030. Upon completion of this transaction, the expanded Masdar entity will become one of the largest clean energy companies of its kind and be well positioned to lead the industry on a global scale.

The announcement consolidated the efforts of all three partners, combining their renewable energy and green hydrogen portfolios into Masdar, leveraging the existing clean energy pioneer's strong international legacy and brand identity. The new Masdar partnership builds on the creation in January 2021 of the Abu Dhabi Hydrogen Alliance, comprised of Mubadala, ADNOC and ADQ and the launch on 17 November 2021 of a new global renewable energy venture between ADNOC and TAQA. As the UAE prepares to host COP28 in 2023, this partnership positions Abu Dhabi and the UAE at the forefront of the energy transition. The new combination will further drive de-carbonisation of power across local and international markets, while accelerating the UAE's path towards net-zero carbon by 2050 and cementing its leading global role in green hydrogen.

The new partnership envisions a comprehensive focus on renewable energy and green hydrogen. TAQA will take the leading role with a 43% shareholding in Masdar's renewable energy business with Mubadala retaining 33% and ADNOC holding 24%. Meanwhile, ADNOC will take the leading role with a 43% shareholding in Masdar's green hydrogen business, with Mubadala holding 33% and TAQA 24% respectively. The partnership envisages parties entering into detailed agreements as well as completion of necessary transaction requirements, including obtaining relevant third party and regulatory approvals.

## Tenaris to supply line pipe to QatarEnergy

TENARIS HAS RECEIVED a contract from QatarEnergy (represented by its agent Qatargas Operating Company Limited) to supply a complete package of seamless line pipes and bends for the North Field East (NFE) Project.

The NFE Project represents the first phase of a major LNG expansion in the state of Qatar aiming at increasing its LNG production capacity from 77 to 110 million tons per year, with an expected production start date in 2025.

Tenaris will manufacture and supply QatarEnergy with 197,000 tons of welded, high-end sour service pipe, 11,800 tons of seamless pipe and 206 bends. The production of welded tubes will take place at Tenaris's Confab mill in Brazil, while the seamless tubes will be manufactured at the Dalmine and Siderca mills, located in Italy and Argentina, respectively.

"This contract is the result of almost three years of hard work. We built a value proposition covering both seamless and welded tubes while going through a very stringent qualification process. We are very excited to be part of this milestone project in the North Field," said Andrea Previtali, Tenaris vice-president of Linepipe Services.



Image credit: Tenaris

*Line pipes for the NFE project.*

"The vast technical knowledge and expertise Tenaris has acquired, alongside our robust quality management system and long-term relationships with key partners, allowed us to be well positioned with QatarEnergy for this important endeavor," added Previtali.

The NFE Project is the first phase of a larger project known as the North Field Expansion Project (NFXP).

The NFXP envisages developing additional gas reserves from the North Field to feed six new LNG mega-trains, ultimately increasing the State of Qatar's overall LNG production by 64% by 2027, from 77 to 126 million tons per year.



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# Aramco squares up to the energy transition

A changing world calls for a changing company, as Aramco gears up to meet all the challenges of the energy transition head on, says Martin Clark.

**A**S THE WORLD grapples with the energy transition and the challenges of net zero, so too does top oil producer Aramco. Saudi Arabia's flagship company has long pioneered hydrocarbons development, underpinning the world's oil supply at critical times, but it is also exploring its long-term options as climate change concerns come into focus. At the start of December, it signed agreements with a number of French firms in areas ranging from carbon capture to hydrogen-powered vehicles. Clearly, these are changing times for all.

Indeed, the state oil giant provided a glimpse of what to expect in its hugely successful initial public offering (IPO) two years ago, in which it raised US\$30bn from investors – an event that would have seemed unlikely not too many years earlier. It marked the start of a new era for the oil champion.

## Energy infrastructure

Aramco is still every bit in favour with global investors, as it seeks to leverage its vast infrastructure base that spans every corner of the kingdom's energy sector, from production to trading. In the latest example, BlackRock Real Assets and state-backed Hassana Investment Co. signed a US\$15.5bn leasing deal for Aramco's gas pipeline network in December. The three partners are to form a new company, Aramco Gas Pipelines Co, that will receive a tariff payable for Aramco gas that flows through the network over a 20-year period. Aramco still retains full ownership and operational control of the network.

It follows a separate US\$12.4bn deal earlier in 2021 selling 49% of Aramco's oil



*Aramco sees gas playing a crucial role in the energy transition.*

Image Credit : Aramco

pipelines to a consortium led by US-based EIG under a similar structure. The transactions together highlight the ongoing appeal of Aramco's energy infrastructure to global institutional investors.

The gas network transaction also marks the largest energy infrastructure deal in the region thus far. It highlights the importance of natural gas during the energy transition, according to Aramco's president and CEO, Amin H. Nasser.

"With gas expected to play a key role in the global transition to a more sustainable energy future, our partners will benefit from a deal tied to a world-class gas infrastructure asset," he said.

BlackRock's chairman and CEO, Larry Fink, called it a "landmark transaction" for Saudi Arabia's infrastructure sector.

"Aramco and Saudi Arabia are taking meaningful, forward-looking steps to transition the Saudi economy toward renewables, clean hydrogen, and a net zero future," said Fink. "Responsibly-managed natural gas infrastructure has a meaningful role to play in this transition."

## Business as usual

In many ways, though, things continue much as before for Saudi's state oil giant.

Announcing its third quarter results for 2021 recently, the company enjoyed a 158% year-on-year increase in net income to US\$30.4bn, largely the result of higher crude oil prices. As ever, Aramco continues to underpin Saudi Arabia's evolving economy with its sustained oil and gas production from the fields that have powered the world for decades.

Nasser identified some economic headwinds facing the global economy, notably supply chain bottlenecks, but was optimistic overall about future energy demand.

He also pledged to continue with the strategy to invest for the long term, which inevitably means pushing into new energy technologies as part of Saudi Arabia's transition to achieve net zero by the middle of the century.

Total hydrocarbon production in the third quarter of 2021 stood at 12.9mn bpd of oil equivalent (boepd), including average crude oil production of 9.5mn barrels per day (bpd).

“Responsibly-managed natural gas infrastructure has a meaningful role to play in this transition.”





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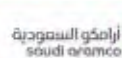
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During the quarter, the Hawiyah gas plant expansion project – a part of the Haradh gas increment programme – reached advanced stages of construction and is expected to be on stream in 2022.

But there is much activity elsewhere, away from oil and gas, that suggests the times are anything but normal right now as Aramco spreads its wings.

The group achieved financial close on the 1.5 gigawatts (GW) Sudair solar PV plant during the third quarter, in which its subsidiary Saudi Aramco Power Company (SAPCO) holds a 30% stake. It will be one of the largest solar plants in the region, with a first phase expected to begin producing electricity during the latter half of 2022.

Aramco's involvement in this project marks its debut participation in the Public Investment Fund's (PIF) renewable energy drive, reflecting its efforts to advance more into sustainable energy solutions – likely to be a key trend in the years ahead.

Fellow stakeholders in this project include ACWA Power and Water & Electricity Holding Co. (Badeel), a company owned by PIF.

## Industrial investments

Another strand of Aramco's growth, transition and diversification plans is the move to expand its industrial base. It has already confirmed a major expansion of its industrial investment programme, Aramco Namaat, with the signing of 22 new Memoranda of Understanding (MoU) and one joint venture agreement. This initiative is focused on capacity building in four key sectors: sustainability, technology, industrial and energy services, and advanced materials.

The goal is to ensure greater reliability of

energy supply and effectively localise the industrial supply chain and implement circular carbon economy concepts. Namaat complements the company's own flagship In-Kingdom Total Value Add (iktva) localisation scheme, as well as the government's Shareek initiative.

“ The Jafurah basin holds the largest liquid-rich shale gas play in the Middle East.”

In one deal, Aramco has teamed up with Indian conglomerate Larsen & Toubro (L&T) to develop manufacturing capabilities in Saudi Arabia in line with the Namaat initiative.

The collaboration will support L&T's efforts to establish the region's first Heavy Wall Pressure Vessels site at Jubail Industrial City, which will produce critical equipment for several industries, including the power and oil and gas sectors. L&T is due to start construction of the new facility imminently, with production expected to commence by the third quarter 2022.

Aramco's new ventures also mark a new sense of adventure for the company as it transitions, evolves and explores new industries and technologies. Among its portfolio of deals signed with French firms recently, it is sponsoring the first hydrogen-fuelled truck to compete in the Dakar Rally, which will take place in Saudi Arabia in 2022. It forms part of a tie up with Gaussin, a pioneer in clean and intelligent transport

solutions, to explore hydrogen-powered vehicle manufacturing for on-road and off-road hydrogen vehicles in the kingdom.

Other deals include an MoU with Air Liquide to study low carbon hydrogen and ammonia production, as well as carbon capture opportunities, plus a tie up with Alteia to develop advanced artificial intelligence-driven geospatial imagery interpretation and processing capabilities within Saudi Arabia.

## Unconventional gas

The times are even changing for the desert kingdom's vast oil and gas fields, as it pushes into new frontiers, including unconventional hydrocarbons. Aramco recently awarded US\$10bn worth of contracts to start development of the giant Jafurah unconventional gas field, the country's largest non-associated gas field.

It is a milestone both for the commercialisation of Saudi Arabia's unconventional resources and the expansion of Aramco's own integrated gas portfolio. With an estimated 200 trillion standard cubic feet of gas in place, the Jafurah basin holds the largest liquid-rich shale gas play in the Middle East. It is potentially a huge undertaking. Capital expenditure at Jafurah is expected to reach US\$68bn over the first 10 years of development.

Nasser called it a “pivotal moment” with implications for the nation's long term energy security and economic development. He said the gas “will help significantly reduce emissions in the domestic energy sector, while providing a feedstock for low-carbon hydrogen and ammonia. It will also allow Aramco to tap into high-value feedstocks for use in the expanding downstream petrochemicals industry.” ■

## Drilling and workover site launched

ARAMCO AND HORIZON Project Company Ltd have broken ground on a 277,000 sq. m drilling and workover site at King Salman Energy Park (SPARK), the world-class energy and industrial city. Construction is scheduled to be completed by the second quarter of 2023.

The complex will provide infrastructure and amenities for a workforce of 1,200 drilling and workover employees. Aramco and Horizon Project Company Ltd have signed a 22-year Build, Own, Operate and Transfer (BOOT) contract for the project. The project will strategically situate new facilities for Aramco's Drilling and Workover Services Department in a single location, with centralised drilling services and operations.

Through its new facility at SPARK, Aramco aims to capitalise on its proximity to oilfield service providers to foster a culture of collaboration and innovation. It also aims to support development and localisation of key industries such as rig and equipment manufacturing, as well as casting and forging.

Senior vice-president of Upstream at Aramco, Nasir Al-Naimi, said, “This is another significant venture by Aramco that will contribute to business continuity. We expect the new drilling and workover facilities to attract other oilfield services companies, who have an indispensable role to play within the collaborative setting of an integrated energy ecosystem.”



Breaking ground at the new drilling and workover site.



## BISAL celebrates 20th year in business

BYRNE INVESTMENTS SAUDI Arabia Limited (BISAL), a leading equipment rental company and KSA arm of the Byrne Group, is celebrating its 20th year in business

The company has grown from a modest team of only a handful of people to employing a multi-disciplined and multinational team of more than 350 people, including a strong body of local Saudi talent, offering high quality turnkey solutions to multiple industries across the kingdom, including oil and gas, events, manufacturing and logistics, construction and infrastructure, marine and ports and defence and military.

BISAL launched its operations in Dammam in 2001, and over the last two decades the company has expanded its footprint across the entire kingdom with offices and depots in Dammam, Jubail, Riyadh, Thuraif, Jeddah and Yanbu. Today, the company boasts an extensive rental fleet of over 5000 units of equipment and growing to meet the current and anticipated future demand.

To celebrate this milestone achievement, Byrne Group's deputy CEO Pat Fallon and chief strategy officer Quentin Lo, recently visited BISAL's headquarters in Jubail to commend the team on their efforts.

"Twenty years ago, we established a small depot on the Abqaiq Road outside of Dammam in the Eastern Province, hoping that we could replicate the model we had established from the early years of our foundation in the UAE in the early 1990s. Today at BISAL we are exceptionally proud of our team of committed and skilled individuals, and we recognise and appreciate that our success in this geography is as a result of their hard work, as well as the loyal support of our clients and partners" said Fallon. "Our business model was unique, but the success we've experienced is still a result of putting clients first."

BISAL believes in developing long-lasting relationships based on honesty, integrity and the value of experience. The team is dedicated to listening to their clients and evolving the business and strategies in line with their requirements.

"We believe success comes down to listening to our customers and treating each client individually," said Fallon "Our team has extensive industry experience, and we know the right questions to ask to get to the right solutions. This is why a vast number of our projects result in repeat, long-term relationships."

The last 20 years have seen monumental shifts in consumer behavior, fuelled by the digital age. The pandemic significantly accelerated these changes. The evolving landscape requires expertise and collaboration now more than ever, two things on which BISAL has built its reputation. Whether it's optimising the supply chain, streamlining operations or adapting to meet customers' expectations and exacting requirements, Byrne is committed and focused on finding the right solution.

"We've assembled a team who consider the entire customer journey," said Pat. "It's humbling to look back at the projects and people our team have worked with over the past two decades. We take a lot of pride in seeing the positive impacts our partnerships have made – not just on the immediate, day-to-day operations, but also on long-term business resilience.

"Looking across the entire Byrne Group, the KSA market is where we have seen the greatest market development, particularly over the



Image Credit: Adobe Stock

*Byrne's solutions are offered to multiple industries in Saudi Arabia.*

past ten years. Looking ahead, The Kingdom of Saudi Arabia is an area of exceptional opportunity to expand our operations even more, with additional depots and product lines to be considered. It has been a rewarding journey for us all so far and we look forward to seeing where the next 20 years will take us."

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# Moving COP26 discussions to reality

ADIPEC 2021, the global energy industry's largest, most important and influential event, underscored the sector's readiness to embrace the challenges of the energy transition.

**T**AKING PLACE IN Abu Dhabi from 15-18 November, ADIPEC was held under the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the United Arab Emirates, and hosted by the Abu Dhabi National Oil Company (ADNOC).

During the Strategic Conference, Ministers, CEOs, global policymakers and energy professionals discussed the mission to meet the global demand for cleaner energy. Key themes from the conferences included new market dynamics on a changing energy world; fuelling the future: the new energy agenda; building the energy company of the future; transformational technologies; and hydrogen's role in the energy transition.

Dr Sultan Ahmed Al Jaber, Minister of Industry and Advanced Technology, UAE and ADNOC managing director and Group CEO, addressed the opening ceremony. "We meet at a historic moment. COP26 has just concluded which was a success, yet current energy dynamics have revealed a basic dilemma. While the world has agreed to accelerate the energy transitions, it is still heavily reliant on oil and gas.

"As economies bounce back from the Covid-19 pandemic, at the fastest rate in 50 years, the demand has outpaced supply, and after almost a decade of under investment in our industry, the world has sleep-walked into a supply crunch. It is starting to wake up.

"The oil and gas industry has to invest over US\$600bn every year until 2030 just to keep up the expected demand. Although renewable energy is the fastest growing segment, oil and gas is still the biggest and will be, for decades to come."

Dr Al Jaber added that technologies such as AI and big data are being applied into every segment of the business. As he stressed upon the importance for economies to act sooner, he informed the audience of projects that ADNOC is already engaged in to employ green practices. "From January 2022, 100% of our grid power will come from clean sources such as nuclear and solar. This will



Image Credit: dmg events

ADIPEC 2021 provided an opportunity to meet face-to-face once again.

“What the world needs now is to hold back emissions, not progress.”

significantly reduce ADNOC's operational emissions." He noted that this would make a practical contribution to the UAE's net-zero by 2050 strategic initiative "not in years from now, but in a matter of weeks."

He welcomed partnerships with ADNOC from across the global energy ecosystem, and stressed that rewiring the energy system was a multi trillion dollar business opportunity that can work towards resolving the energy dilemma and is "good for the climate, humanity and economic growth".

He explained that the UAE is "well-positioned to become a major producer and exporter of blue hydrogen", following four successful shipments ADNOC has already made this year to Japan and South Korea.

"What the world needs now is to hold back emissions, not progress. We have the

skills, the resources, the partnerships to make the change."

The Minister also expressed the UAE's excitement in hosting COP28 in 2023, where the nation hopes to use the forum as a "catalyst for practical, commercial and sustainable energy solutions."

## Rising to the challenge

H.E. Mohammad Barkindo, Secretary-General, OPEC, said, "The challenge is managing how to reduce greenhouse gas emissions that have been impacting our climate. The Intergovernmental Panel on Climate Change (IPCC) and many other reputable scientific institutions have called upon the global community many times to deploy their resources, their ingenuity, come up with policy measures, projects and programmes to address greenhouse gas emissions.

"The oil and gas industry is no exception. This industry has the capacity, resources, and innovative mind, to rise to the challenge. We need the world to understand that this industry must be part of the solution to



climate change. We are not climate deniers, and we're ready to play our part in ensuring that the outcome of the Glasgow COP26 talks and the climate park that came out of Glasgow is comprehensively inclusive and implemented by all parties in a fair manner, including our member countries."

Tayba Al Hashemi, CEO of ADNOC Sour Gas and ADIPEC 2021 chair, underscored the importance of industry collaboration as the event drew to a conclusion.

She said, "ADIPEC 2021 returned as an in-person event at a crucial time for the energy industry as we take stock of the outcomes of COP26. This week we have seen organisations from across the energy world come together at ADIPEC 2021 to explore, collaborate and chart the next stage of sustainable growth for our industry, delivering more energy and fewer emissions.

"We must do more to accelerate

“ We must do more to accelerate decarbonisation.”

decarbonisation, but we cannot simply unplug from today's energy system and into a cleaner energy model of the future. This is what we have been exploring here at ADIPEC 2021."

ADIPEC 2021 hosted the newly launched Smart Manufacturing Conference, providing a unique platform for the manufacturing industry to gain insights into the energy transition and identify the challenges and opportunities for manufacturing in the drive to net zero-carbon energy.

Other conferences included the Technical Conference, Downstream Technical Conference, Offshore and Marine Conference and the ADIPEC Forum for Diversity, Equity and Inclusion.

The Digitalisation Zone provided insights on big data, cloud and machine learning with 100 specialist companies showcasing the latest ways digitalisation can enhance the energy value chain. Meanwhile, the newly launched Smart Manufacturing Zone highlighted how the impact of smart technologies is being felt across the complete manufacturing ecosystem.

ADIPEC 2021 also provided a forum for several landmark industry deals. These included the US\$6.2bn agreement between



Tayba Al Hashemi, CEO of ADNOC Sour Gas and ADIPEC 2021 chair.

Borealis and ADNOC to expand Bourouge's output, and the deal between Petronas and Baker Hughes to collaborate on technology to support the energy transition. In addition, a major new green hydrogen venture between ADNOC and TAQA was agreed, and a partnership between Mitsui, GS Energy, and ADNOC to develop a world-scale low-carbon blue ammonia facility was also concluded. ■

Image Credit: dimg events

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# A global approach to the energy transition

Key takeaways from the UN climate meeting and the future trajectory of the energy transitions were discussed during the COP26 Panel at the ADIPEC 2021 Strategic Conference.

**T**HE ADIPEC 2021 Strategic Conference provided the perfect setting to gather the world's energy ministers and policymakers to chart a clear path for the energy industry to align itself with the outcomes of COP26 and to shape government policy and industry behaviour in the months and years to come.

The first official Ministerial COP26 Panel since the conclusion of the UN climate meeting in Glasgow featured energy ministers from Bahrain, Portugal, Senegal, and Turkey. They highlighted the growing importance of natural gas and the need to support developing countries through the energy transition as critical factors fuelling the future through a new energy ecosystem underpinned by climate concerns and emission-reduction goals.

His Excellency Dr. Mohamed bin Mubarak Bin Daina, Envoy for Climate Affairs and chief executive of the Supreme Council for Environment, Bahrain, said, "We made our commitment [to net zero] by 2060 but we also made a pledge to ourselves that we would reduce emissions by 10% in 2025 and 20% by 2035. We are also committed to providing the most efficient and affordable state of energy mix. We need to help developing countries to grow and not put obstacles in front of their growth."

His Excellency João Galamba, Deputy Minister and Secretary of State for Energy, Portugal, commented, "There's a virtuous relation between renewables in general and green hydrogen. We have now created the conditions under which hydrogen cannot be hype; it has to be a reality. Hydrogen solves some of the problems of renewables, and renewables make hydrogen possible. Countries that are competitive in their renewable mix will be competitive in producing hydrogen. Bringing consumers on board is a critical success factor for any decarbonisation strategy."

Her Excellency Dr. Aissatou Sophie Gladima, Minister of Petroleum and Energies, Senegal, said, "Today, in Senegal, 2% of electricity comes from clean energy, from wind



The panel highlighted the growing importance of natural gas and the need to support developing countries through the energy transition.

“All we need are a political commitment and willingness, and a pragmatic and creative approach.”

energy, so the aim is to increase this level. However, due to the geographical constraints, we need to electrify our remote areas, and to do that we need to create green energy, and produce more power from energies like natural gas. Energy transition needs to be done in a fair manner, a transparent manner, and an increasing manner: all African countries need to work together to defend these principles”.

His Excellency, Dr. Alparslan Bayraktar, Deputy Minister, Ministry of Energy Natural

Resources, Turkey, said: "The infrastructure is there, the sources are there, all we need are political commitment and willingness, and a pragmatic and creative approach to make this happen. We believe that gas can play a major role for this transition, and we need to successfully manage this transition."

Earlier in November, the UN Framework Convention on Climate Change (UNFCCC) officially announced that the UAE will host the 28th Conference of the Parties (COP28) in 2023.

Also announced at COP26 was the launch of the UAE and the International Renewable Energy Agency's (IRENA) US\$1bn global finance platform that aims to finance 1.5 GW of new renewable energy power in developing countries by 2030. The Energy Transition Accelerator Financing (ETAF) Platform secured US\$400mn anchor funding from the Abu Dhabi Fund for Development (ADFD) as its first strategic partner. ■

Image Credit: dmg event



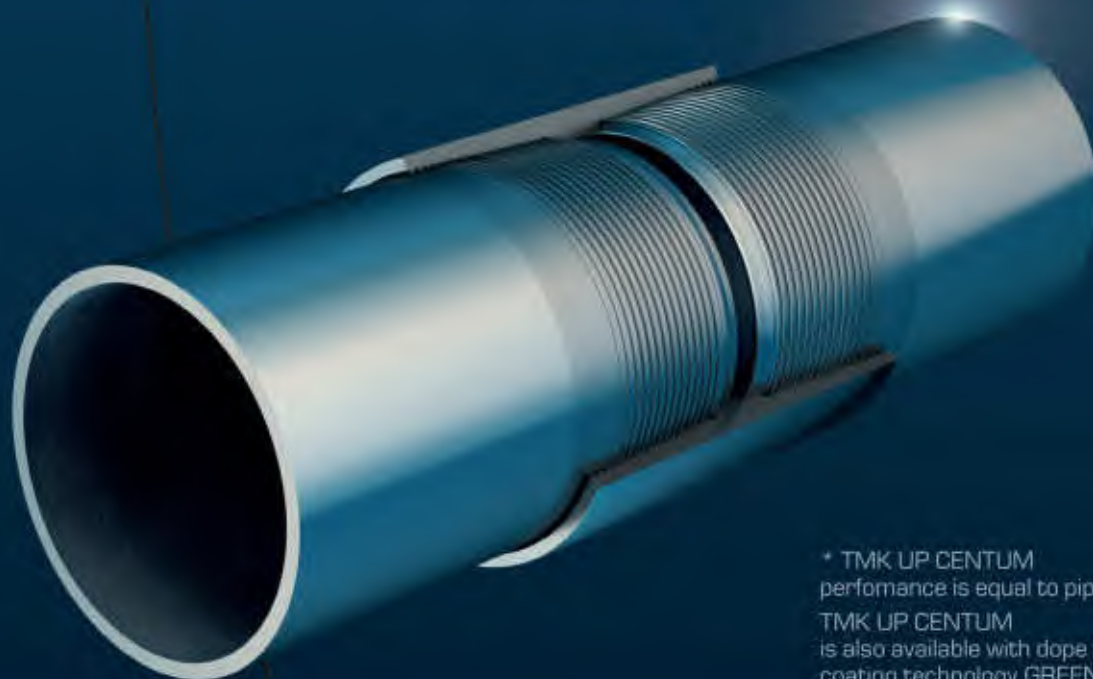


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## Energy leaders set the scene for equity in education

SETTING THE SCENE for an equitable future requires vision, accountability and action, according to energy leaders speaking at the ADIPEC 2021 Forum for Diversity, Equity and Inclusion. Diversity, equity and inclusion is achieved by ensuring the policies in place satisfy the unique needs of every individual in the workforce. The Forum addressed the structural inequalities that the industry is facing and what is required to support organisations in creating equitable solutions that attract and retain talent, building a resilient and sustainable energy industry.

Giving a keynote address, Mariët Westermann, vice chancellor, New York University Abu Dhabi, discussed the importance of equal opportunities and inclusive education and what can be done collectively to ensure access to effective and inclusive education opportunities.

She said, “It is a great sign of the decade that sustained discussion about diversity, equity, and inclusion are no longer outliers in any sector. There is an urgent need for human diversity to be treated as an asset if we are to have a sustainable future.

“While we have seen progress in this century for the inclusion of women and other marginalised communities, the goal of giving every human being free, equitable chances in life remains elusive. Persistent areas of inequality



Image credit: dng events

**Mariët Westermann, vice chancellor, New York University Abu Dhabi.**

include job opportunities, compensation, health benefits, family leave, workplace culture and safety, advancement prospects, and leadership positions, to name a few.”

According to Westermann, inequalities are most apparent for gender gaps. The Sustainable Development Goals adopted by all member states of the United Nations in 2015 have high aspirations for gender parity. The fifth SDG is

the most comprehensive; to achieve gender equality and empower all women and girls by 2030 – only eight years from now.

However, between 2015 and 2020, when the Covid-19 pandemic hit, little progress was made. Rates of female participation in the labour force remained at 64%. In professional jobs, improvement was marginally better, from a rate of employment from 71% to 73%. However, women remain massively underrepresented across sectors.

“Education is a bright spot and is an essential tool to see diversity, equity and inclusion flourishing at an individual and societal level and help create an equitable future,” she concluded.

As the world focuses on creating a net-zero future, the role of diversity, equity and inclusion in the energy industry is taking on increasing importance. For example, the IEA Gender Initiative aims to mainstream diversity and inclusion in energy policymaking, develop a stronger understanding of gender balances throughout the energy sector and shape the priorities for policy action in future decision-making. Similarly, the European Commission is establishing an Equality Platform for the energy sector to offer a space for discussion of issues relating to equality, facilitating exchanges of experiences and highlighting best practices.

## Fuelling a digitally-enhanced, sustainable future

HOSTED BY THE Ministry of Industry and Advanced Technology (MoIAT), the Smart Manufacturing Conference at ADIPEC highlighted the competitive advantages of the UAE’s industrial sector, and introduced international delegations to investment opportunities in the country.

Giving the opening speech, Minister of State for Advanced Technology, Sarah bint Yousef Al Amiri, explained the Ministry’s plans to support industry.

“The lessons learnt from the last 18 months reiterate that innovation, creativity, scientific advancements and technological deployment need to be weaved into the fabric of the sector. We need to move away from referencing a laundry list of technologies and gadgets and more towards utilising technologies as a springboard and a mechanism to convert challenges into opportunities.”

She stressed upon the need to converge various technologies and integrate them into core sectors rather than depend on a single technology to unlock the full potential for industries. Here she brought to light the integration of the Fourth Industrial Revolution (4IR), a fusion of advances in artificial intelligence (AI), robotics, the Internet of Things (IoT), genetic engineering, quantum computing, and more.

“To successfully harness 4IR we need to focus on three things. First, we need agility in governance, and we need to be adaptive and responsive to the face of change. We therefore require future literate, tech savvy mindsets – not just in the business society but also at all levels of government and business. Second, there is no one size fits all solution. Each industry is different and has its own needs. Moreover our technologies that are in place are no longer plug and play. They need critical enablers, including skilled people and agile processes. This is why we launched Operation US\$300 billion, where we will focus on existing industries as well as seeding new industries such as space, hydro production, food-tech and med-tech, to make it 4IR-friendly from ground up.”

The petrochemical industry is one of the priority industries within the Operation US\$300bn strategy, as well as clean energy, such as hydrogen, where the UAE

seeks to be a global leader in its production and export. Furthermore, MoIAT’s participation at ADIPEC was themed ‘Make it in the Emirates’, one of the ministry’s strategic initiatives and an open invitation to investors, innovators and developers to be part of Operation US\$300bn, which puts the applications of the Fourth Industrial Revolution at its centre.

UAE Industry 4.0 was launched in September, which will support manufacturers to integrate new technologies into existing operations and also inspire new industries, new processes and new ways of creating and producing.

Supporting the transition into Industry 4.0, MoIAT recently launched the 4IR Index initiative, which capitalises on a global standard to support industrial players including the oil and gas sector. The ministry also announced a US\$5bn tech fund in partnership with Emirates Development Bank to support this transition.

“The UAE is utilising its position in advanced industries and technologies and low-carbon and carbon-neutral energy to promote sustainable economic growth following the pandemic. We believe integrating 4IR solutions into the industrial sector is pivotal in promoting a knowledge- and innovation-based economy in line with the country’s vision for the next 50 years.”

Ms Al Amiri noted that oil and gas sector would continue to play an instrumental role in the global energy market. The most competitive and sustainable oil producers will be the ones to dominate the energy market, and for that, advanced technology is vital.

“In the UAE we understand that climate change will necessitate that we rethink how we produce every barrel of oil. It is our belief that advanced technology and sustainability go hand in hand, and therefore we are moving towards embedding and applying advanced digital technologies at each step of the production process to reduce carbon intensity as well as production costs,” she explained.

**By Shilpa Chandran**



## ESTM introduces its coiled tubes at ADIPEC

ONE OF THE seven global manufacturers of coiled tubing, and the only API-certified mill in Europe, ESTM LLC presented its products to leading oil and gas operators at ADIPEC.

The Russian tube manufacturer offers a wide range of continuously milled coiled tubes that are made in compliance with the best world standards, attested by API Q1 and API 5ST certificates. Coiled tubing (CT) is a continuously milled length of pipe used in advanced oil and gas production technologies. It is deployed in a well to perform workover and well intervention operations on oil and gas wells of various depths and curvatures. CT technologies are at the cutting edge of the petroleum and gas industry as they have a number of key benefits over conventional pipes.

It was an honour to welcome H.E. Omar Al Suwaidi, UAE Under-Secretary of the Ministry of Industry and Advanced Technology, at the ESTM stand. The overall interest in the Russian exhibit was colossal. Having studied ESTM products, Al Suwaidi contacted the key UAE oil and gas operator, Abu Dhabi National Oil Company (ADNOC), to foster their cooperation with ESTM.

“We have been informed that the main Arab oil servicing companies are used to working primarily with American and Chinese coiled tubes. But the range of products, the pricing policy, and – most importantly – the quality of CT strings that we offer, have impressed the ADIPEC 2021 guests. It is not surprising, because we at ESTM adhere to the highest standards in the industry. We are the only CT mill in Russia and Europe to hold API Q1 and API 5ST certificates,” said Ruslan Saldeev, ESTM sales director.



Image Credit : ESTM

The ESTM stand attracted much interest at ADIPEC.

Denis Manturov, the Minister of Industry and Trade of the Russian Federation, also visited the ESTM stand and pointed at the success of the Russian coiled tubing manufacturing sector. With the plant opened in December 2017, today ESTM products account for 80% of the Russian market.

“Participation in ADIPEC 2021 has been extremely fruitful,” said Ruslan Saldeev. “We’ve met with more than 30 potential customers, and we look ahead with confidence. ESTM is determined to meet the demands of the European and the Middle Eastern markets.”

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# Addressing ESG concerns with breakthrough technologies

Sherif Foda, chairman and CEO of MENA oilfield services company NESR, spoke to Oil Review Middle East at ADIPEC about the company's enhanced focus on ESG and the groundbreaking technologies it showcased at the show.



Image Credit : NESR

*Sherif Foda, chairman and CEO, NESR.*

**S**USTAINABILITY AND ESG took centre stage at ADIPEC 2021, which provided an opportunity to follow up on discussions at COP26.

For NESR though, sustainability and ESG principles are nothing new, having been at the heart of the company since its foundation. Now, the company is further demonstrating its leadership in this area with the launch of its ESG Impact segment at the beginning of this year, to provide the tools to help the industry produce at a lower carbon footprint and play a key role in the energy transition.

"Take flaring for example – today you can reduce the footprint of the oil and gas industry by 40% if you stop flaring completely," notes Foda. "The technology is available, so it is a matter of economics. The price per barrel should therefore take into account the reduced emissions.

"The other area, which is equally important, is methane. Signatories to the Global Methane Pledge announced at COP26 are committed to reduce methane emissions by 30% by 2030. The energy sector can achieve that if there is no flaring anywhere in the world.

"What about the heat from all this equipment and rigs and refineries, can you capture it and convert it to energy? The technology is available – again there is a cost, but if you take into account the carbon neutrality, it makes sense."

Detecting, monitoring and measuring emissions is crucial to be able to pinpoint leaks and take action to reduce emissions. At ADIPEC, NESR announced its investment in Qube Technologies, a provider of continuous emissions monitoring technology that enables oil and gas operators to better detect, measure, and reduce methane and other

GHG emissions, using its unique metal-oxide sensor technology and software platform.

Another focus area for the company is water management. Addressing this issue could really help the industry to transform its image, according to Foda. "Water is a huge problem in the Middle East. We are dependent on RO plants and desalinating seawater. The oil industry produces up to seven or eight barrels of water per barrel of oil. Why can't we take that water, to make us self-sufficient, and where we have excess, clean it and give it to the community, showing the world we can make a positive contribution to the region? We have some breakthrough technologies to make that economical. And if you take into account the lowered carbon footprint, it makes it even more economical.

"If you have a carbon transfer price, as discussed at COP26, many of these projects become viable," Foda adds.

At ADIPEC, NESR showcased groundbreaking technologies including its new rotary steerable, developed with investors and partners, which has drilled wells in Oman, the USA and China, and which the company is looking to commercialise by next year. "It features the highest dog leg in the industry, and is transformative from an innovation perspective as well as in terms of execution in downhole technology, which is usually extremely complicated," explains Foda, adding that it addresses the huge demand for RSS systems in Middle East reservoirs, a market traditionally dominated by the major service companies.

Another partner technology showcased was the K-BOS, the industry's first blowout "stopper" (vs. the conventional "preventer"), a game-changing safety valve that can shear and seal instantly. It was first deployed

successfully in the region in August 2021 and has subsequently met or exceeded operational standards of key customers in the region.

"We see the K-BOS as a true ESG technology, as it not only takes the probability of dangerous pressure events to nearly zero, but also due to its applicability in high H<sub>2</sub>S fields that are characteristic throughout MENA," says Foda. "We see ample opportunity to pull this technology through in areas with high H<sub>2</sub>S and those proximal to local communities, allowing for transformational unlock of reservoirs that were previously hard to reach or present a significant HSE risk."

Foda sees a positive future for the oil market in the region. "The region is going through a supercycle, in my opinion. You're going to have strong growth because of the lack of supply capacity, so all the countries of the region will have strong plans to increase capacity and ensure it is sustainable. We will see increased activity throughout the region, from the GCC to North Africa.

He adds, "Global demand is already at 100mn bpd, but given the rate of decline, just to maintain 100mn bpd next year, even if there's no increase in demand, will require another 4mn barrels capacity. This will need to come from this region, as the USA will not be able to make up that difference, as it did in the previous cycle." ■



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# Promoting ties between Malaysia and the Middle East

Jai Shankar, director and sustainability lead, oil & gas, chemical & energy at MATRADE, the Malaysian export promotion agency, spoke to Oil Review Middle East about the involvement of Malaysian oil and gas companies in the Middle East, the role of MATRADE and the Malaysian participation at ADIPEC.

**J**AI SHANKAR BEGAN by discussing the strengths of Malaysian oil and gas companies, stressing that the Malaysian oil and gas sector is very mature.

“What it brings is to the fore is a lot of experience; many of these companies have been around for many years, serving primarily Petronas and other oil companies based in Malaysia. So they know the business.

“The second thing, which I believe is underappreciated, is communication – Malaysian companies understand local expectations. This is important because much of the time we deal with global players and the expectations are global in nature. The relationship has changed because contractually, it’s no longer just about product quality and price, it’s about partnership and knowing your partner. Communication, understanding and managing expectations on a global level are even more important today, with ESG and sustainability concerns coming to the fore. That appreciation is important, moving forward. You’ve got to make sure your service delivery, people management and supply chain meet expectations in regards to sustainability, ESG and governance.

“That’s one of the big things we’re looking at – educating Malaysian companies and ensuring they understand the expectations, demands and pressures on oil and gas companies so there’s a level of confidence as far as the buyer or project holder is concerned. In the past we did not have all those expectations, regulatory and stakeholder pressures. All eyes now are on the industry. The whole world economy is going through a transition period.”

“The second big trend alongside sustainability is digitalisation,” he continues. “This has accelerated due to the fact that over the past couple of years there has been tremendous pressure on costs, exacerbated by Covid. The oil and gas sector has been very conservative in the past, but now we are seeing digitalisation in the true sense of the word, on a broad level. ADNOC is digitalising



Image Credit: MATRADE

**Jai Shankar, director and sustainability lead, oil & gas, chemical & energy, MATRADE.**

wholesale, as are all the majors. It’s real, it’s here and it’s present across the supply chain. We understand and appreciate that.

“Digitalisation is entwined with sustainability, as it will provide the data framework that will enable sustainability. We see that need and are applying ourselves to that.

“So ultimately that is our value proposition; starting with our experience and understanding, and moving forward, the sustainability path, and digitalisation.”

Discussing the outlook for Malaysian oil and gas companies in the Middle East, Shankar comments, “Malaysian oil and gas companies are very comfortable in the Middle East, for various reasons. The communications and cultural fit are there, which makes it easier. More importantly, they have strong relationships with the major players in the market. Matrade has offices in Jeddah, Dubai, and Qatar, there is a sizeable Malaysian population here involved in oil and gas, and you can find Malaysian engineers who have been working in this region for a long time. We’ve got the ecosystem, which makes market access easier.”

Shankar adds that Malaysian companies are looking to use the Middle East as a

platform to reach the booming African market, through partnerships with Middle East companies.

“Malaysia has very good relations with African countries. Middle East companies have historical links, while Malaysia has the manpower. Malaysian companies are ready to be more aggressive and are looking to evolve and expand internationally. Malaysian companies are multicultural and international in outlook, and are comfortable in approaching new markets. For us, meaningful partnership matters; the way we access markets is through relationships.”

Malaysian companies are also looking at the Middle East as a hub and base for joint ventures, he says. “A lot of companies here are looking to expand. Malaysia can act as a base to access East Asia, ASEAN, and south Asia. We are really encouraging partnerships; with digitalisation you need partnership, because a lot of innovations are at an early stage, and you need a track record and industrial partners.”

Turning to the role of MATRADE, J says this encompasses two key areas – capacity building and export promotion.

“Participation at events such as ADIPEC gives us the market intelligence to prepare our companies. MATRADE has 46 offices worldwide, we have our ear to the ground for the demand trends, then get our companies ready, onboard them and encourage them to participate. We are in discussion with many of the major companies in the region such as Aramco and bapco, to help onboard them.”

Sixteen leading Malaysian companies showcased their products and services at the Malaysian Pavilion at ADIPEC, representing a diverse range of companies. They included innovative digital company Innoveam, which specialises in 3D data solutions using virtual reality and augmented reality; Pioneer Engineering, a leading service provider in the Malaysian oil and gas industry; and MIT Technologies, which presented new technologies for drilling and completion. ■





# Tapping into the hydrogen goldmine

While the clean fuel of the future basks in glory, there are challenges that must be addressed, collectively and urgently, says Shilpa Chandran.

**H**YDROGEN AS A clean source to reduce carbon energy has been gaining reputation as the fuel of the future, and according to a recent study by Goldman Sachs, green hydrogen could meet up to 25% of the world's energy requirements in less than 30 years, with a market value above US\$10 trillion.

Countries have been tapping into this clean fuel alternative since the 1970s, with momentum now accelerating to shift from the traditional crude oil dependency by global economies.

The emphasis on hydrogen in a diversified energy sector, the challenges it faces, the opportunities and the need to build strategic policies in promoting hydrogen deployment all came under the spotlight during the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC).

"For us, sustaining a reliable source of clean energy is one of the pillars of our future economy, in the next 50 years. That drove our commitment to COP, and made us consciously invest in attracting and regulating future energies. Hydrogen is one of the potential elements of the future, and in the UAE we are interested in producing the cleanest barrels in the world," said Suhail Mohamed Al Mazrouei, Minister of Energy and Infrastructure in the UAE, during a Hydrogen Ministerial Panel at the event.

“The roadmap is aligned with the nation's commitment to address global climate challenges.”

## Hydrogen Leadership Roadmap

In November, the UAE announced the Hydrogen Leadership Roadmap, a comprehensive national blueprint to support domestic, low-carbon industries, contribute to the country's net-zero ambition and establish the country as a competitive exporter of hydrogen.



Image Credit : Adobe Stock

*Green hydrogen could meet up to 25% of the world's energy requirements in less than 30 years, according to a recent study.*

The roadmap is aligned with the nation's commitment to address global climate challenges, and supports the UAE's Net Zero by 2050 Strategic Initiative, which is in line with the 2015 Paris Agreement.

"We will regulate this new fuel, enabling the business community and technology to give us solutions and scalability of its deployment. Secondly, we have announced large projects, the likes of which are the ADNOC blue ammonia project that will use hydrogen to produce relatively cleaner ammonia," added the Minister.

The UAE is already implementing several projects targeting export markets such as Japan, South Korea and Germany. Additionally, the country has already started building a green hydrogen plant, claimed to be the first in the Middle East. It aims to capture 25% of the global hydrogen fuel market by 2030.

HE Al Mazrouei urged countries and companies which have already embarked on a learning curve with hydrogen to share their

expertise to keep pace with these ambitions, and on behalf of the UAE vouched support to emerging markets, such as Africa.

## Hydrogen in Africa

In Uganda, up to 95% of its energy comes from renewables, including hydrothermal, solar, biomass and geothermal.

"When we talk about hydrogen I am here to see how I can run with people in the field when I am just crawling," noted Ruth Nankabirwa Sentamu, Minister of Energy and Mineral Development of Uganda. While the country has been continuously integrating energy sources to provide energy to its far-flung villages, there is concern on tapping into a source such as hydrogen considering its high costs.

The Minister made an open invitation to invest into the country, and welcomed collaborations to help navigate concerns over costs and eliminate one of the region's most pressing issues, energy poverty.

Lending support to this cause, HE Al



Mazrouei stressed the need for collaborative efforts between government, corporates and private sectors as the key to develop the hydrogen industry. With clarity of policy, a boost in investments and unlocking new collaborations, hydrogen can be leveraged from a niche sector to being mainstream.

“ We have to be pragmatic and practical in how we can take this forward.”

“For our friends in Africa, they need their right of energy. It is unfair to ask a country that is just starting to deal with the availability of energy to all its population to follow the most expensive option. That is why we have to be pragmatic and practical in how we can take this forward, and build strategic roadmaps where we will define scalability, and supporting technologies for subsequent utilisation. Certain countries can afford it and go into it faster. These countries can help



Up to 95% of Uganda's energy comes from renewables.

Image Credit : Adobe Stock

encourage technologies to be innovative.”

He pointed out that while there may be several challenges to address, there is also relief in the fact that countries are engaging in open discussions to tackle them.

“We are dealing with so many challenges

at the same time, but I am glad we are talking about it, and I can tell you that we in the UAE will share our knowledge, do something about it and we will work with everyone who is ready to work with us to find solutions,” he concluded. ■

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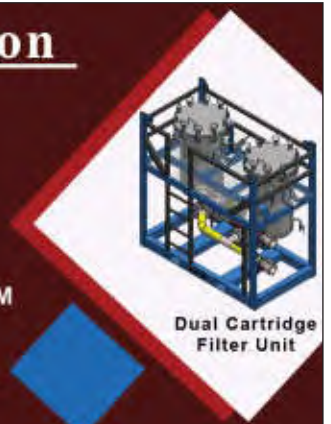
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# Sustainable solutions for the energy sector

At ADIPEC, Al Masaood Group showcased four of its business units and 13 global brand partners, highlighting its strategy to strengthen its energy divisions, the shift to integrated solutions and the focus on sustainability.

**S**PEAKING TO OIL Review Middle East, Hani El Tannir, Group Head of Commercial, Al Masaood, said, “Nobody talks about products any more. Customers are looking for a solution which involves you as a provider adding value; this is the future. You’re adding value by doing applications engineering or another form of engineering to come up with the optimum product backed up by a proper service package or approach; this is the new trend. For us it is a natural evolution to be talking about solutions rather than just products, because that’s what we’ve been doing for a while anyway, so the market has come to us.

“Today, out of our six divisions there are three that lend themselves seamlessly to integrated solutions, because they are divisions where we can add value. Even with our divisions selling standard products, we’re adding services and adding value. The name of the game is adding value and offering your client a lot more than just a product.”

Sustainability was one of the main themes of Al Masaood’s participation at ADIPEC.

“Sustainability has to be the focus because clients are demanding this,” commented El Tannir. “By definition we do a lot of work for the government and semi-government sector, who are looking for sustainability when evaluating bids. That means we have to be quite clear about the sources of our material and how we handle and process products. For example, Al Masaood Bergum modular solutions is now looking for materials for

building its units which are 100% environmentally friendly, while the power division is looking at how to get clean energy into electrical vehicle charging units. It’s happening; we’re pushing ourselves as much as we can, our clients are pushing us, and we’re something pushing our clients!

“The preparations for COP28 are creating a great deal of awareness around net zero emissions,” he went on. “The trend is very much towards sustainability, clean energy and renewables. We’re talking to two enterprises now about carbon capture, with a view to introducing a carbon capture system.”

At ADIPEC Al Masaood signed a technology partnership agreement with Italy-based BTS, provider of EPC services for biogas development projects. They will launch a pilot project to introduce BTS’s technology to the UAE market.

“Abu Dhabi National Oil Company (ADNOC) is becoming a lot stronger in its drive to cleaner energy, in line with the international energy companies, announcing net zero targets and a major drive towards hydrogen,” El Tannir continued. “ADNOC is pushing us and the entire sector towards greater sustainability. There is more interest in decarbonisation and carbon neutrality, with Abu Dhabi’s Tadweer just announcing the first big tender for waste to energy, following Sharjah and Dubai.”

In line with the UAE Energy Strategy 2050, Al Masaood has been promoting the use of the latest diesel engine technology, which is



Image Credit: Al Masaood

**Hani El Tannir, Group Head of Commercial, Al Masaood.**

fuel efficient with minimal maintenance and low operating costs. The Group also supports the enhancements on hybrid and battery systems to not only ensure power supply stability, but also lower carbon emissions and increase operating efficiencies. Smart microgrid solutions are another focal point.

An aspect which is receiving more emphasis is software and technology innovation. At ADIPEC, Al Masaood signed an agreement with 4IR Solutions to distribute its real-time crude oil analyser focusing on process monitoring, analytics, control and safety applications.

“This technology turns the tracking of flows in an oil pipeline into a fine art with the use of sophisticated sensors and the addition of AI,” explained El Tannir. “It is not technology for technology’s sake; it allows refineries to make better decisions and adapt flows to achieve better economies.” The group is keen to invest in technology where it adds value, he said.

Commenting on Al Masaood’s experience at ADIPEC, El Tannir noted that it is the first time the company has participated as an exhibitor. He was impressed with the volume and high calibre of visitors, which demonstrates confidence.

“The market has bounced back strongly and created a momentum, and we want to maintain it,” he concluded. ■



Image Credit: Al Masaood

**The Al Masaood team at ADIPEC.**



# A dope-free alternative for premium connections

voestalpine Tubulars, manufacturers of high-quality seamless steel pipes and tubes, promoted DryTec® – its dope-free alternative for premium connections – at ADIPEC.

**T**HE COATING OFFERS many significant advantages compared with traditional thread compounds in terms of efficiency, safety and environment protection, and is currently available for its proprietary connections VAGT® and VAsuperior®.

DryTec is lubricant free, saving preparation and installation time. Compared to thread connections with thread compound, where transport/storage compound has to be removed and installation compound has to be applied, connections with DryTec are ready to install, with no water needed to remove transport/storage compound, also eliminating the potential dangers of handling slippery equipment.

There are savings to be made in not requiring a crew to clean the material in the yard or at the rig site. Additionally, an element of potential human error is removed by avoiding the risk of a poor cleaning job, and/or poor dope application, which can affect connection integrity over the life of the well. The elimination of working steps, such as removing the storage compound, cleaning the threads and applying the running compound, has a noticeable positive impact on cost and time savings, as well as reducing the likelihood of injury to personnel.

Excess thread compound can clog sand screens, valves, and perforations. It can also cause wireline operation failures and completion fluids contamination. It causes damage to the near-well zone by clogging pores and reducing the inflow rate. DryTec protects against these problems, thus eliminating the risk of well contamination. It also simplifies the disposal of used thread connectors.

“Much interest has been shown from the Middle East in this technology.”



Image Credit : voestalpine Tubulars

**DryTec® offers significant advantages compared with traditional thread compounds.**

Trials have shown that the DryTec technology performs well in extreme conditions of heat and cold, while successful use cases have further proven its efficacy. In the first use of the technology in the USA, Cabot Oil & Gas installed 12,697 feet of voestalpine Tubulars' production casing, including VAsuperior-ET-DryTec® in June 2021. The benefits of increased safety achieved through less on-site handling, and the minimised environmental risk were well recognised, along with its connection performance on par with the doped product.

The company commented that DryTec is a “great product”.

“DryTec could be the safe solution for us in future. In addition, regarding ESG, the disposal of thread protectors is much easier than protectors of doped threads.”

Also in June 2021, Netherlands-based Vermilion installed 3,850 feet of voestalpine Tubulars' production casing with VAGT-DryTec® with a semi-automatic pipe handler

with top drive make-up.

In addition to the increased safety on-site and time savings for preparation operations compared to pipes with doped threads, the positive environmental aspects as well as easier re-use and disposal of thread protectors were well received.

Vermilion commented, “DryTec will be the future, because it makes work cleaner and there is no contamination of completion tools and thread protectors with dope. DryTec saves all the costs for the pipe thread preparation at the storage yard, creating a monetary benefit for Vermilion.”

Much interest has been shown from the Middle East in this technology, particularly given the elimination of the requirement of water onsite to remove the compound, a clear advantage in desert conditions, and the reduced risk of contamination with sand given that DryTec is not sticky. The environmental benefits are also appreciated, given the increased ESG focus in the region. ■

# Improving the performance of wet-gas flow meters

Dr Bruno Pinguet, Multiphase Domain senior advisor at TÜV SÜD National Engineering Laboratory, discusses why widely deployed wet-gas flow meters are delivering significant inaccuracies.

**T**HE USE OF wet-gas flow meters (WGFM) is growing around the world, particularly in Asia Pacific and the Middle East, and can be classified into three main categories:

- **Single-phase** – gives a continuous measurement of the gas flow rate only.
- **Two-phase** – gives a continuous measurement of both the gas and the liquid flow rates.
- **Multiphase** – continuously measures the gas and the liquid flow rate, as well as the water to liquid ratio (WLR).

Each of the above flow meter types can be selected based on an operator's need, the stream conditions, and a cost/benefit analysis. However, offering continuous measurement of the liquid flow rate and WLR is becoming a mandatory requirement for most applications. This is because the condensate has a market value itself, which is usually three times higher than the crude. The detection of any water breakthrough is also of importance for effective reservoir management.

Venturi tubes are one of the most common types of flow measurement devices used worldwide for wet-gas conditions and form the main component in most commercial flow meters. Over the past 60 years, an extensive research effort has developed robust correlations to correct meter over-reading due to the unexpected (or not) presence of liquid in the gas phase; this led to the development of ISO 11583:2012. The uncertainty in the correction factor ( $C/\Phi$ ) quoted in ISO 11583:2012 is between  $\pm 2.5\%$  to  $\pm 3\%$ . However, this is not the overall gas mass flow rate uncertainty. The uncertainty in the fluids properties should be correctly accounted for

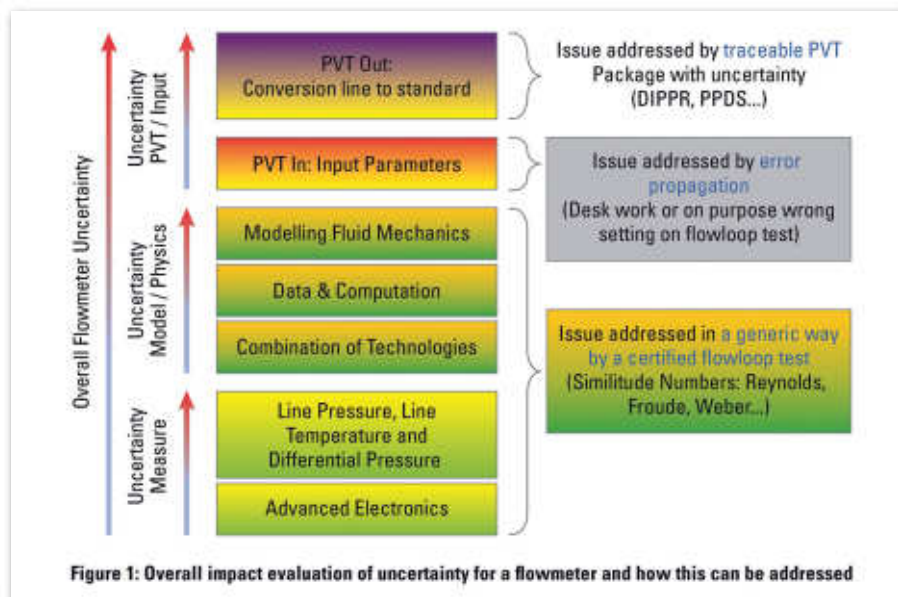


Figure 1: Overall impact evaluation of uncertainty for a flowmeter and how this can be addressed

to obtain the overall gas and liquid flow rate measurements. Under test laboratories conditions, with well characterised fluids, the overall gas mass flow rate uncertainty is of a similar value to the uncertainty in the correction factor, since the uncertainty contribution of the fluid properties is very low. However, the uncertainty contribution under field conditions could be substantially higher. This can critically affect allocation accuracy and lead to potential disputes between different production platforms or custody transfer applications.

## Meter testing

A WGFM is often selected based on standard production conditions or at the early stages of the reservoir's lifetime. Before it is deployed, a WGFM sometimes goes through a dynamic Factory Acceptance Test (FAT) at a test facility, using a flow loop. As it is essential to ensure that the WGFM undergoes proper evaluation, this should include a test matrix which can only be provided by a test facility that is independent of any meter manufacturer. This is the only method to properly characterise the flow meter performance against fully traceable and certified reference flow meters under controlled and stable conditions.

Subsequently, when a flow meter is installed in the field it is sometimes tuned or

tested against a test separator. After commissioning, the reservoir engineer is left to update the necessary input parameters to the meter software correctly. These should include the fluids composition or the densities of the fluids. Other input parameters, depending on the technologies being used, should include the fluids' conductivity and/or permittivity, as well as the fluids' gamma-ray absorption coefficients. During a flow loop test, such parameters can be measured accurately, but this is usually not achievable in the field.

Moreover, wet-gas flow meters that incorporate phase fraction devices may also need to be calibrated by filling the meter with only one liquid phase at a time. Again, this is possible during laboratory tests, but less so under field conditions. Neither is obtaining fluid density, viscosity and composition with low uncertainty a straightforward task for wet-gas conditions in the field. While commercial solutions are available for sampling wet-gas flow rates, there is no single industry standard for wet-gas sampling methods and techniques. Consequently, fluid parameters with a high uncertainty, or which do not adequately represent real-world flowing fluids, may be used as the input for testing wet-gas flow meters.

It is therefore highly important to properly assess the sensitivity of the correlations or models employed to the fluid properties



measurement uncertainties. As such, uncertainties can be substantially propagated to the final flowrates output and should not be disregarded. The flow meter end-user should therefore quickly run a sensitivity analysis for the correlations, which are included in ISO/TR 11583 and ISO/TR 12748. It is vital not to use proprietary correlations or models as the operator may artificially insert a wrong value of a chosen parameter (e.g., liquid density, gas density etc.) in the meter software during a FAT test. However, no flow loop can address the specific needs of every end-user, and there is no facility in the field capable of achieving the level of uncertainty claimed by some wet-gas meter manufacturers.

### Test separator limitations

If a wet-gas meter is tested or tuned against a test separator, then it is vital to ask how trustworthy the test separator is as a reference standard and how often such an exercise should be repeated?

A test separator needs to be appropriately sized, carefully maintained, and properly operated to deliver a field reference standard and accuracy. However, this is rarely achieved in the field. Also, the WGFM is often situated

at a considerable distance from the test separator and will therefore experience different line conditions. As such, it is then necessary to properly account for any changes in the fluids due to pressure and temperature. In summary, there is no guarantee that a WGFM tested or tuned against a test separator is measuring the flow rates accurately or that it will measure the flow rates accurately under future field conditions.

### Laboratory versus field

Correlations to correct the response of an orifice meter or a Venturi tube in wet-gas flows have been developed in the past and have been published in ISO/TR 11583 and ISO/TR 12748. This means that the correlations can be inspected and their sensitivity to the different input parameters easily assessed. The pressure loss ratio equations available in ISO/TR 11583 are another good step forward.

However, the risk with any empirical or semi-empirical correlations is when it is used outside the experimental conditions upon which it has been developed. Generally, the correlations employed in wet-gas flow meters are based upon tests carried out in a flow

loop and it is impractical to bring the accuracy of a laboratory flow loop into the field. Likewise, it is impractical to bring every field condition into the flow loop. However, parameters such as liquid viscosity, surface tension and gas viscosity may be systematically changed in a flow loop to match the range encountered in the field. While this is an expensive exercise, it will offer a solid basis for the future development of wet-gas flow meters.

It is clear that the performance statement or verification of wet-gas flow meters should be based on proper development and the use of a test matrix, alongside the final use. Computational Fluid Dynamics (CFD) could also be used to establish performance beyond the capability of test facilities. Additionally, an analysis of the input parameters and the associated error propagation should be completed. Finally, the conversion of the flow rate and uncertainty from line conditions to standard conditions should be carried out through the propagation of error on the equations associated with the pressure-volume-temperature (PVT). This scientific method to address the entire performance of a flow meter (wet-gas or multiphase) is summarised by Figure 1. ■

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**SUPPORTING OIL, GAS & ENERGY INDUSTRY SINCE 1995**

# STATE-OF-THE-ART SMART VESSELS SOLUTION FOR BETTER MARINE VESSEL OPERATIONS



The AI and ML-powered Smart Vessels System sets up ships and sea vessels in a proactive mode, offering real-time surveillance, enhanced safety and security, and powerful reporting.

## THE INDUSTRY - OIL AND GAS

The demand for oil and gas continues to grow strong globally, steering global macroeconomic and geopolitical situations. Technological breakthroughs, coupled with the rising exploration interests of different nations, makes the Oil & Gas industry a highly sought-after and lucrative market. To deal with challenges concerning oil price dynamics and supply-demand imbalances, firms in the sector need to rely on Intelligent surveillance, Artificial Intelligence, and Machine Learning to harness real-time data. Gathering and analysing data help streamline operations, reduce costs, and ensure HSE practices.

## THE PROBLEM

The existing offshore support systems in vessels were less efficient on a number of fronts -- safety, security, surveillance, decision-making, and communication. Furthermore, the absence of real-time data presented major threats, such as the inability to discern weather patterns, inadequate situational awareness, and ineffective monitoring of crew onboard. Finally, sea vessels are accident-prone, especially in events such as poor visibility or personnel falling overboard. These problems present cumulative challenges to the entire system, such as inaccurate data, poor efficiency, lack of safety, etc., which translate to limited operating capability for firms in the oil and gas industry.

## THE SOLUTION

MVP Tech's Smart Vessel Solution harnesses the power of the latest technological advancements like AI (Artificial Intelligence), Machine Learning (ML), and Intelligent surveillance. The system is tailor-made to continuously scan, analyse, detect, identify, and prevent incidents with the help of multiple, well-placed, intelligent cameras, sensors, and audio network speakers.

Utilizing our AI and Engineering capabilities, our team of AI scientists and software engineers developed a custom AI analytics software, where the system will be able to detect multiple key events or threats happening simultaneously using intelligent cameras, generate an audible warning alarm via network audio speakers and visual alarms displayed through the Video Management Software on the Monitors in the captain's bridge.

The solution is also capable of ensuring proper HSE practices; it significantly improves operational efficiency and safety by creating optimal vessel conditions.



## THE APPLICATION

MVP Tech's Smart Vessel Solution finds its application in a number of offshore and onshore vessel activities:

- **Surveillance:** The solution improves surveillance comprehensively with video management systems to cover the entire vessel, including restricted areas and exit points. The cameras are equipped with tripwire built-in analytics, where a virtual line would be drawn across the threshold point. The system automatically generates an alarm when it detects crossing of that line.
- **Safety:** Using ML, the solution eliminates manual personnel checks by detecting PPE and HSE violations, ensuring crew safety. Furthermore, classifying the sea swells automatically using an inclinometer sensor, the AI-powered system is able to detect periodical movement of a ship at any direction and classify the condition of the sea accordingly based on a pre-defined threshold.
- **Detection:** With its continuous surveillance capabilities, the solution can detect, identify, and analyse any abnormal actions, triggering alarms and alerts to the control team for prompt mitigation. Thus, the trained AI analytics software using ML, can detect, classify, and alert for any slip and fall actions.
- **Visibility:** Incorporating a high-powered image recognition system, the solution improves visibility by identifying objects in the surroundings. In the case of detecting man overboard, with thermal cameras covering the vessel sides and stern area, the AI analytics is trained to pick up and detect movements out of the vessel to avoid nuisance reoccurring alarms. Furthermore, it plots the GPS positioning of such events.
- **Communication:** The onshore command and control centres have access to real-time data during vessel movement in addition to all onboard analytics, automatically store on the NVR (Network Video Recorder) and pushed into the central synchronization when the vessel is back on port via backend wireless communication system.



## THE RESULT

MVP Tech's Smart Vessel Solution has eliminated challenges that reduce operational efficiency and safety. Notably, it has managed to be one step ahead of its competitors by achieving several critical results, which include

- **Enhanced Health & Safety Practices:** The solution enhances decision-making capability (e.g., by analysing weather patterns), provides a safe working environment, and detects abnormal behaviour promptly.
- **Real-time access & communication:** The solution minimizes uncertainty by providing real-time video access to the onshore command and control centre. The solution achieves this with an AI cloud system, a central repository for local video and data information on board. With real-time data, the centre can ensure vessel security and empower vessel operations with powerful analytics.
- **Reduction in costs:** The solution elevates the role of the onshore command and control centre as it is communicating and controlling multiple vessels. This brings about better decision-making, ultimately reduces operating costs and leads to better utilization of resources.
- **Improved Navigation:** The built-in AI functionality helps in better detection of objects in the surrounding area. The solution assures intelligent surveillance by generating alarms and providing the quickest post-event analysis.

- **Automated Crew Safety Check:** The Smart Vessel Solution automatically detects PPE & HSE violations; it also detects security hazards concurrently throughout the operation.
- **Eliminating Accidents:** The solution is designed and developed to classify sea swells as Red, Yellow, or Green, with green indicating normal conditions, yellow indicating warning conditions, and red indicating alarming conditions. Also, the Man Overboard Analytics Detection System monitors man overboard events and triggers immediate, actionable information to response personnel. Furthermore, the intelligent cameras can detect the exact GPS location of the fall, mitigating risks even in unfavourable climatic conditions.

This solution has demonstrated not only measurable benefits but also an excellent ROI for our existing customers.

### Vendors:



### AI stack:

YOLO Detection, C-Sharp, Central Tracker



Contact us



## Mobile emissions treatment in line with Saudi and Middle East green initiatives

ENDEGS, THE MARKET leader in mobile combustion technology, has developed the world's first fully equipped, autonomously operated, trailer-mounted vapour combustion unit (VCU) for hydrocarbons, with combustion power available in 5, 10 or 20 MW capacity.

The company's vapour control technologies have been used over several years – mainly for tank and pipe degassing, VRU replacement and loading applications. Some of them have lasted up to three years, involving the degassing of hundreds of liquid gas tankers or sea vessels in the chemical, petrochemical and gas industries.

For more than 14 years, ENDEGS has been offering professional project management for mobile vapour treatment of all kinds of gases, gas compounds and vapours of explosion groups IIA, IIB and IIC, ensuring a combustion rate of almost 100% during maintenance, repair, decommissioning, TAR, and emergency operations.

"Whether complete service or individual modules for rent, we find a customised solution for every challenge, no matter how individual it is. That makes the difference," says Kai Sievers, founder and CEO of ENDEGS GmbH.



Image credit: ENDEGS GmbH

**ENDEGS has developed the world's first fully equipped, autonomously operated, trailer-mounted VCU for hydrocarbons.**

Besides the oil and gas industry, ENDEGS also serves clients in other industries such as fertiliser, automotive and others, where the products and their challenges are different. For example, cryogenic products such as ammonia or substances such as butadiene tend to polymerise, and they need a special degassing procedure – of course without smoke or flame, and without polymerisation.

The ENDEGS own developed solution for mobile degassing can be used at any place, without the need of a crane. The solution is time and cost effective and can be placed close to the place of maintenance, which would release the vapours to the atmosphere. Furthermore, ENDEGS has developed working processes which are also patented to minimise the overall risk and increase the level of safety. The mobile combustion unit from ENDEGS is able to handle the vapours from a tank, vacuum truck and/or intermediate tanks all at once without any impact of noise, open flame or odour on the surrounding environment. In addition, ENDEGS' highly skilled operator controls the process and ensures the safe operation for all workers involved. As well as safety, the protection of the environment and the reduction of the greenhouse gas footprint are top priorities.

For further information contact ENDEGS ARABIA Ltd., 1st Industrial City, SA – 31441 Dammam – P.O. BOX 1997 + 966 569 999 008 or +31 6 1 9 87 63 22 Gertjan.pieterson@endegs.com; www.endegs.com

## Discover solutions for your industry with Rittal

NEW TECHNOLOGIES AND trends are transforming the oil and gas industry. Digitalisation, individualisation, and climate protection are prime examples. Rittal, the leading global systems provider for enclosures, power distribution, climate control, IT infrastructure and software, addresses the resulting challenges faced. The company's industry-specific know-how relating to the legal framework, regulations and industry standards gives it a better understanding of customer requirements.

"Rittal is ahead in recognising the evolving needs and trends of the industry," said Xander Kruger, managing director, Rittal Middle East.



Image credit: Rittal

Xander Kruger, managing director, Rittal Middle East.

Rittal's webcasts enabled oil and gas professionals to learn more about Rittal's offerings.



Image credit: Rittal

The various partner levels serving the end customers are rapidly adapting to the latest technologies to provide an efficient and economical solution.

"Rittal – The System" benefits from a high level of flexibility and standardisation that helps the company provide made-to-measure industrial and IT solutions for customers, covering all industry sectors.

### Explosion protection in the oil & gas industry

Explosion protection markings and standards may seem complicated at first, but they can be easily decoded and used to protect people and assets

when running electrical and control equipment near explosive and flammable materials.

Rittal helps you understand the safety requirements and standards for explosion protection and translate that into easily deployed products to help safeguard your process environment.

A series of webcasts hosted by Rittal expert Nick Tamizifar, vertical market manager for Process Industries, was held in October 2021, enabling oil and gas industry professionals from around the world to learn more about the offerings from Rittal for the vertical market (oil and gas). The audience turnout and webcast series campaign was a huge success.



# The importance of well integrity management

Halliburton Landmark discusses how its DecisionSpace® Well Integrity Management software can help minimise risks and reduce production losses.

**T**ODAY, THERE IS an increased number of producing fields that exhibit late life symptoms such as ageing well stocks, high water cut, and flow assurance issues. These symptoms can lead to well integrity issues such as high casing pressure, mechanical failures, or corrosion problems. Many gas fields report high CO<sub>2</sub> and H<sub>2</sub>S content, which can pose challenges for pipe metallurgy and reliability. Faced with more stringent regulations, a shrinking experienced workforce, and the need to control costs, E&P operators' focus on Well Integrity Management (WIM) has increased.

The post-2014 price collapse strengthened WIM, when E&P companies started to look for cost-effective ways to improve recovery from existing fields. Wells that were shut in or impaired due to well integrity issues became obvious opportunities for production gain. These issues also drew attention to the need for better processes and systems to improve well integrity performance.

The past few years have seen an accelerating adoption of digital WIM systems by E&P companies that want to standardise their WIM processes, automate workflows, and drive better risk management.

**DecisionSpace® Well Integrity Management** software helps minimise risks and associated production losses by streamlining well integrity monitoring and analysis. With automated and integrated workflows, it delivers rapid diagnosis of well barrier elements to spot well integrity risks faster and execute preventive and corrective maintenance. End users can rapidly identify high-risk wells, take corrective actions faster, and mitigate issues to maximise well availability.

## Best-in-class engineering

The traditional practice of using standard operating envelope calculations (e.g., Maximum Allowable Annular Surface Pressure or MAASP) does not always fully address complex and intertwined well integrity risk factors such as well head movement, temperature and pressure effects, casing wear, zonal isolation, and tubing/casing safety factor (SPE 164230. March 2013). There are additional elements to consider in managing the integrity of complex wells such as high-pressure-high-temperature, high H<sub>2</sub>S, or deep-water wells.

Integration with WELLCAT™, a DecisionSpace® software, gives Well Integrity Management software superior ability to detect downhole integrity risks early to help prevent downtime or environmental hazards. Over 80% of operators globally trust WELLCAT for its advanced engineering calculations required for well design.

Workflows in Well Integrity Management software automatically obtain engineering calculations to continuously update the Stress and Load envelopes of the tubulars and alert end users if actual operating conditions trend closer to those envelopes. This approach gives end users a better understanding of how changing operating conditions impact the integrity of the wells, which is not always possible with the simple MAASP-based operating envelopes.



Image Credit: Halliburton Landmark

*DecisionSpace® software streamlines well integrity monitoring and analysis.*

## Flexibility for customisation

No two oilfields are the same, and neither are their requirements for well integrity management. When a software cannot easily adapt to the unique context of an oilfield operation, it can force E&P companies to operate within the constraints of the software, resulting in lost opportunity for innovation and buy-in from the users.

Well Integrity Management software is built on the fully open, interoperable DecisionSpace platform which offers the flexibility for customisation and the ability to create well integrity management solutions tailored to unique business processes and IT environment.

## Future readiness

Any WIM software needs to work in a heterogeneous technology environment. It needs to talk with a multitude of data sources and adjust to changing modes of operations or expansion. An inability to adjust to these changing scenarios adds to architectural complexity and cost of ownership, forcing E&P companies to procure additional technologies to keep up with the growing needs of their business.

The underlying DecisionSpace platform connects Well Integrity Management with a variety of data sources and accommodates evolving workflows, visualisation, and analytical needs without requiring additional technologies. DecisionSpace is the foundation for all Halliburton's digital offerings, and is supported by long-term product roadmaps and R&D investments. With a track record of successful implementations globally, it brings the assurance of referenceable quality and future readiness.

The combination of best-in-class engineering, flexibility for customisation, and future readiness makes Well Integrity Management a unique value proposition for E&P companies looking for a robust, scalable and future proof well integrity management solution. ■

*Discover how DecisionSpace Well Integrity Management software can minimise risks and reduce production losses – email us at [landmark-mena@halliburton.com](mailto:landmark-mena@halliburton.com) or contact us at <https://www.landmark.solutions/Contact-Us>*

# LiuGong moves up a gear

With the launch of new products and the expansion of its dealer network, LiuGong is looking ahead to 2022 with optimism.

**M**ORE THAN 100 LiuGong dealer partners from across Europe met in Zaragoza, one of Spain's most historic cities and the location for the SMOPYC construction equipment exhibition, to share LiuGong's exciting plans for 2022. Under the theme, "Moving Up A Gear", global construction equipment manufacturer LiuGong again demonstrated how its accelerated approach to creating even greater value for their customers and dealer partners will continue at a pace in 2022.

"It's amazing and quite emotional, to be able to meet our dealer partners face-to-face for the first time since November 2019," explained Hakan Ilhan, vice president, LiuGong Europe. "With new product launches right across our range, from the all-new F-Series excavators to our new Dressta TD-15M series-2 dozer, it was great to be able to touch, feel and experience these amazing machines in person."

The 2021 dealer conference was supported by DIR, Spain's exclusive dealer for LiuGong which, with LiuGong's support, has enjoyed rapid expansion since its establishment in 2019.

"LiuGong provided us with the perfect business opportunity," explained DIR's CEO David Iglesias. "They have excellent products, built, tested, and supported in Europe, but they also have a long-term mindset focusing on building relationship and trust. Over the last four years, they have really helped us to establish LiuGong as a potential future leader in the Spanish market."

LiuGong's Dealer Conference was scheduled to coincide with SMOPYC, where LiuGong and DIR showcased their latest F-Series excavators, the all-new 915FCR, 922F and 926F. These new models join the existing line-up of F-Series excavators launched last year, which include the 9018F, the 9027F and the 95-ton powerhouse, the 995F.

Harry Mellor, LiuGong's product manager for Excavators for Europe explains; "With the F-Series range, we have listened to our customers and operators and have delivered a range of machines that are easy to use,



*LiuGong showcased its latest models at the SMOPYC construction equipment exhibition in Zaragoza.*

Image Credit: LiuGong

easy to own and easy to maintain."

The F-Series excavators benefit from spacious, modern, high-visibility cabs with the highest levels of comfort and ergonomics. Visibility and safety are enhanced with the inclusion of 360-degree cameras. Ground level maintenance makes daily checks and servicing faster, safer, and easier. When it comes to power and control, the F-Series machines come with Stage V compliant engines and full electro-hydraulic systems. LiuGong have a reputation for tough excavators and this will be further enhanced by the extended maintenance intervals enjoyed on the F-Series range.

Aside from the new F-Series excavators range, LiuGong have been moving up a gear across their product portfolio, particularly in wheel loader product line and Dressta crawler dozers. Notable highlights from the SMOPYC exhibition were the new Stage V 890H wheel loader and the new TD-15M series-2 crawler dozer. The TD-15M benefits from a new high visibility cab design, increased power output with improved operator control thanks to electrohydraulic joysticks and easy maintenance designed in. Pushing 173 kW (232 hp) and with a drawbar pull of 472 kN, the TD-15M is perfect for roads and highways, landfill sites, forestry and general construction.

"We are thrilled about our new product launches and about the potential for our business here in Spain with DIR and across Europe with all our dealer partners," said chairman, LiuGong Europe Howard Dale. "Our continued growth in Europe will be the result of close co-operation with dealer partners with proven aftersales infrastructure, supported by our industrial capability in Poland and our world-class parts distribution centre. Our proximity to our customers will significantly reduce shipping costs and provide faster delivery on a majority of our genuine LiuGong parts."

With exciting new products in the pipeline, continued investment in people and network infrastructure and a consistent focus on delivering a leading brand and customer experience, LiuGong's dealer partners who attend the dealer conference and visited the SMOPYC exhibition clearly shared LiuGong's optimism for 2022.

According to DIR's CEO David Iglesias. "The pandemic may have caused, and may continue to cause some disruption, but we, together with LiuGong adapt quickly, and find solutions for our customers quickly too. We have already started to move up a gear in our business, and we will continue to accelerate that progress." ■



# What lies ahead for the 2022 video wall market?

Technology company Barco discusses some trends in the video wall space.

**A**S MORE ORGANISATIONS begin welcoming employees back to the office in some capacity, large-format video walls are now taking a more prominent and colourful position in reception areas, meeting rooms and show rooms. Across a host of applications, business leaders see video walls as an opportunity to introduce creativity and a "wow" factor that invites employees and guests to the office and serves as a differentiator.

The close of 2021 saw more business and IT leaders evaluating potential video wall upgrades and installations, setting the tone for another busy year across the market. Here are just three of the ways we see a bright future ahead for the video wall space.

## The rise of LED

The past year has cemented LED as the gold standard of the video wall space. Businesses who have the budget and intent are more willing to invest in displays that produce superior image quality, colour vibrancy and accurate detail. In turn, large video walls that previously were only seen in common, public spaces are becoming – and will continue to become – a standard fixture in corporate environments.

Even as LED displays extend their popularity, the market and demand for LCD video walls remains solid. While not all businesses are ready to or can afford to make substantial technology investments following a turbulent year, those seeking impactful change at a more affordable price are finding a match in LCD displays that support collaboration while delivering meaningful value.

On the other hand, while it still maintains a place in the corporate space, rear projection continues to see a reduced demand. Projection video walls have a niche in applications that require precise and continuous functionality and are less concerned with stunning, high-quality images, such as control rooms and security centres. However, among public-facing environments, we're likely to see the tide



Image Credit : Barco

*The presence of video walls in business spaces is set to grow.*

continue to shift more to LED and LCD video walls where visual appeal plays a greater role.

## The push for techoration

In 2021, the use of video wall technology to create memorable and immersive experiences in public spaces literally became an art form.

While a years-old concept, techoration – or the use of video walls and other display technologies as canvases for engaging, informative and entertaining content – became one of the most fun and competitive innovations we saw last year. With video walls serving as a blank canvas, businesses redefined and extended their brands to public spaces through colourful and brilliant visuals, videos and interactive experiences.

The simultaneous emergence of techoration and more powerful video walls will only foster more creativity in 2022 and beyond. Businesses now understand the challenge of creating memorable first and last impressions and regaining eyes that went elsewhere during the pandemic, and the race to techorate will drive both higher demand for video walls and first-of-their-kind applications.

## The commitment to a more sustainable future

As the New Year approaches, sustainability will continue to evolve from a buzz word to an essential function – even within the visual display space. Businesses are under greater pressure from stakeholders and customers to reduce their environmental impact, including a push for technologies that require less power and fewer resources to operate and maintain.

In turn, video wall manufacturers now are re-evaluating how to develop displays that deliver powerful visual accuracy and impact in a more responsible fashion. For example, we're beginning to see displays that automatically go into "eco-mode" when not in use to conserve power.

With the potential to enliven well-travelled spaces and offer new avenues for engagement and visibility that guides decision-making, the role and presence of video walls in business spaces is only likely to grow in the new era.

There's no doubt that technology and innovation will continue to help us survive and thrive, and I'm excited to see what lies ahead in the New Year and beyond. ■

# Excelling in subsurface imaging and modelling

National Industrialization and Energy Services Company (TAQA) is expanding its product, technology and service offerings.



Image Credit : TAQA

*With its vast experience within the Middle East and North Africa, TAQA has performed operations in some of the most challenging environments.*

**W**ITH ITS STRATEGY focused on creating value for its stakeholders, who include shareholders, customers, and people, National Industrialization and Energy Services Company (TAQA) is committed to continuously developing technologies, products, and expanding its services offerings to cover a wide spectrum of well services through acquisitions and partnerships, thereby helping its stakeholders efficiently harness the full potential of their investments. TAQA's agility and focus on innovation and service quality have been primary factors in it being recognised locally, regionally, and internationally as a first-class service company.

Through its subsidiary, the Arabian Geophysical and Surveying Company (ARGAS), TAQA provides high quality subsurface imaging, modelling, and R&D services. With its vast experience within the Middle East and North Africa, the company has performed operations in some of the most challenging environments, enabling it to build up an extensive portfolio of best practices and procedures to complete projects no matter the challenges presented. ARGAS was founded in 1966 to explore, evaluate, and develop the communities' natural resources and add economic value to where it operates. It deploys

state-of-the-art technology in geophysical data acquisition, processing, reservoir analysis, and estimation services. Over the past 50 years, ARGAS has contributed to more than 700 projects, acquiring more than three million sq km of exploration data.

“Over the past 50 years, ARGAS has contributed to more than 700 projects.”

ARGAS has a proven record in executing and delivering high-quality seismic data along with its processing and interpretation. The company's services include: Seismic Data Acquisition Land, Marine and Transition Zone, Seismic Data Processing and Imaging – both Time & Depth domains, Unconstrained Blended Land Seismic Data Acquisition, Seismic Interpretation, G & G Data Analysis, AVO, Inversion, and Reservoir Characterisation, QC of seismic data at various stages of the seismic value chain, and cutting-edge technology such as DAS (Distributed Acoustic Sensing), Uphole and VSP.

To further expand its service offerings, TAQA fully acquired Cougar Drilling Solutions in 2019, a global provider of downhole drilling tools and services, established in 1969 in Edmonton, Alberta, Canada. The company is committed to being the most reliable, capable, and consistent provider of downhole drilling tools and services globally.

Cougar provides top tier downhole drilling products to the oil and gas industry in Western Canada including drilling jars, shock tools and stabilisation. Over the years Cougar's downhole tools offerings have expanded into a holistic portfolio, including drilling motors and jar boosters as well as proprietary technology such as the Mechanical Thruster, a tailor-built compression-based tool engineered to reduce downhole dysfunction such as shock and vibration while creating consistency in downhole parameters from torque to weight-on-bit and differential pressure.

Cougar entered the drilling services market across the Middle East region in the early 2000s, beginning with directional drilling and measurement while drilling in specific countries. As of today, Cougar offers directional drilling services, measurement while drilling and logging while drilling services in Turkey, Pakistan and Saudi Arabia. ■





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# Digital tools for improved efficiency and sustainability

Debabrata Chakraborty, regional director, MENA & Turkey, Bentley Systems, discusses how digital twins and other digital tools can help companies to create efficient, eco-friendly and productive processes.

## How can digitalisation help operators to achieve their sustainability objectives and net zero targets?

Driven by various factors such as the urgency to reduce carbon emissions and mitigate the impact of climate change, more companies are exploring sustainable solutions. These factors further magnify how important the role of technology is in helping to create efficient, eco-friendly, and productive processes.

Bentley leverages cloud-based computing, data science, and developments in Internet of Things (IoT) technology to capture accurate data. In return, the data captured provides operators a way to enhance performance and output while minimising waste. Moreover, advanced machine algorithms, digital twins and artificial intelligence enable operators to identify metrics that can optimise productivity and performance and minimise energy consumption, thereby reducing carbon emissions.

Operators can use digital tools to produce accurate and scientific data that can help them establish comprehensive environmental, social, and governance (ESG) plans, as well as solid financial analysis. Achieving the goal of carbon net zero is certainly not an overnight process. However, Bentley has available advanced technology and solutions that can accelerate the adoption of sustainable practices.

## How can digital twins boost collaborative processes and ensure safer and more efficient operations?

A digital twin derives data from multiple sources and creates an accurate digital replica of the asset, which evolves through every phase of the project from design, construction, operations, and maintenance.

It provides managers with a broader picture and more reliable insight on different areas and aspects of operations by creating a virtual copy of physical sites, assets, plant processes, and business processes. Paired with artificial intelligence, the digital asset enables managers and decision-makers to

identify areas and aspects that need enhancement. In plant sites, for instance, managers can leverage digital twins in the designing, scheduling, and planning phases of the plant and its processes to further improve operational efficiency, resilience, and enhance safety measures. The use of digital twins also means that you can reduce the number of site visits and therefore reduce risk as maintenance teams can access the digital twin remotely and only visit the plant when necessary.

“ Saudi Arabia leads a comprehensive digital transformation as part of its Vision 2030, which shifts from traditional processes to digital and automated systems.”

## How receptive is the Middle East and Saudi Arabia in particular to digital technologies? How is Bentley helping Middle East operators to optimise their operations?

During the COVID-19 pandemic, various industries in the Middle East were sharply reminded of the benefits of having a robust digital transformation strategy to ensure business continuity. For example, the oil and gas sector, one of the main economic drivers in the region, is experiencing not only the impact of the pandemic, but also changing market dynamics, increasing safety and environmental pressures, rising operational costs, and workforce shortages.

These challenges drive both public and private sectors to develop and enhance their digital capabilities as well as explore opportunities to further revolutionise the energy sector. Saudi Arabia, named as Top Digital Riser among the G20 nations, leads a comprehensive digital transformation as part

of its Vision 2030, which shifts from traditional processes to digital and automated systems.

With our innovative solutions, Bentley Systems is the infrastructure engineering software company. We play a vital role in providing regional industries and organisations with solutions aimed at minimising disruption, reducing risks, lowering costs, improving safety, and increasing productivity and performance.

One example of the benefits that our solutions bring to our users is enabling them to work within an open, connected data environment. This environment is a set of cloud-provisioned or on-premises services that provide support to digital workflows, context, and concepts, so firms can access accurate, reliable, and consistent information.

Using our Bentley iTwin platform, digital information managers can incorporate engineering data created by diverse design tools into a living digital twin and align it with reality data and other associated data without any disruption to their current tools or processes. The platform helps organisations create digital twins of their assets and projects, which are integrated with Bentley's open environment, enabling them to gather information from multiple sources, thus increasing accuracy. Additionally, enhanced connectivity allows operators to share relevant data for collaboration and smarter decisions, and enables firms to deliver reliable and safer projects with a greater return on investment.

Various industries and sectors across the Middle East are already integrating digital systems and solutions in their operations. For example, Oman Gas (now OQ) improved its reliability performance by 9% through the use of a digital, automated framework to manage asset reliability and integrity. The digital workflow helped to eliminate human fault analysis, improve resource effectiveness, and facilitate a proactive approach to asset maintenance. We will continue to innovate and explore other solutions that can boost the digital transformation of more of the region's organisations. ■



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## Enteq Technologies' SABER tool unveiled at ADIPEC

ENTEQ TECHNOLOGIES RECEIVED a hugely positive reception at ADIPEC for its SABER Tool, an innovative alternative to traditional rotary steerable systems (RSS) for directional drilling.

The SABER Tool, launched in February this year, is an evolution of the proof of concept, tested by Shell and licensed to En-teq, representing a step-change in directional drilling technology. The En-teq team, which has expanded rapidly in response to its product development and global growth ambitions, has re-engineered the concept with the application of proven technologies in novel ways, drawing on the centre of expertise for rotary steerables in the Cheltenham area of the UK. The result is a mechanically simple, plain collar and compact design that promises excellent control and new levels of reliability. The SABER Tool has undergone downhole and system testing to verify its ability to hold its directional tool face stationary under varying, dynamic downhole conditions, with results demonstrating that its unique simplified control system works to successfully hold the geostationary platform.



Enteq expects the SABER Tool to be commercial by mid-2022.

Image credit: En-teq Technologies

## Halliburton introduces iCruise X intelligent rotary steerable service

HALLIBURTON COMPANY HAS introduced its iCruise X Intelligent Rotary Steerable System, the improved drilling platform targeted to longer, harsher applications to deliver precise well placement and reduced well time. The iCruise X is equipped with an advanced steering head fit for greater durability in operations with variable fluid conditions and in fluids with high solids content. It delivers in high temperature environments and provides more power for steering. Halliburton designed the iCruise X steering section with the latest metallurgy and design techniques. The collar includes new connections to better resist torsional oscillation and cyclical bending at higher doglegs. The extra force available for steering delivers geologically complex wells and curves faster and provides a stiffer assembly for straight well sections.

The intelligent rotary steerable system includes advanced electronics, sophisticated algorithms, multiple sensors and survey packages, and high-speed processors to support drilling automation. Through LOGIX Autonomous Drilling Platform, iCruise X automatically drills the well in real-time, to provide operators with faster, consistent, and repeatable drilling performance.

## Expro launches the world's first fully autonomous well intervention system

EXPRO, ONE OF the leading providers of energy services, has launched Galea – a fully autonomous well intervention system to maximise production while reducing intervention costs, HSE risks and environmental impact. Galea replaces larger, conventional and more labour-intensive wireline rig-ups for a range of slickline operations such as solids removal, plug setting/pulling and logging surveys. The system can be configured in a variety of operating modes to suit a range of applications both onshore and offshore.

In fully autonomous mode, Galea deploys a tool string into the well either at regular intervals or as defined by the well conditions. With continuous remote monitoring available from anywhere in the world, Galea can increase production at reduced operating costs and remove personnel from the worksite while significantly reducing the carbon footprint of intervention operations. In semi-autonomous mode, Galea performs a pre-programmed intervention sequence, initiated locally or remotely. In manual mode, Galea enables quick rig-up intervention compared to conventional operations. The system also reduces the impact of operations on the environment around the well site. Galea has several fail-safe features to ensure containment and eliminate potential wire-breaks during interventions.



Galea is the latest addition to Expro's portfolio of future-facing technologies.

Image credit: Expro

## AVEVA introduces upgraded design and process simulation tools

AVEVA, ONE OF the global leaders in industrial software, announced three add-ons to AVEVA E3D Design, infusing AI capabilities into the industry's most advanced engineering design software which maximises efficiency through cloud collaboration. The FTSE 100 company also announced a sustainability enhancement for AVEVA Process Simulation – an integrated platform spanning the process engineering lifecycle of design, simulation, training, and operations.



Image credit: AVEVA

Amish Sabharwal, executive vice president, engineering business unit at AVEVA.

The latest enhancements of AVEVA E3D Design and AVEVA Process Simulation empower organisations from chemicals, oil and gas, power, marine, and mining, metals and minerals to design sustainable processes and plants at the speed the market demands. The new AVEVA E3D Design add-ons improve engineering quality and efficiency through expedited, streamlined design processes, while AVEVA Process Simulation enables organisations to move beyond linear, wasteful workflows to implement circular, sustainable processes.

"Digital transformation is the key enabler for sustainability, efficiency and agility. AVEVA E3D Design and AVEVA Process Simulation enable organisations to build digital plant designs that will empower the future. With E3D Design, teams can collaborate across disciplines to avoid rework and on-site retrofits," said Amish Sabharwal, executive vice president, engineering business unit at AVEVA.

The new features of AVEVA Process Simulation put sustainability at the heart of process design. The new renewables library includes the models necessary to design renewable power generation networks for wind turbines, solar panels, electrical distribution, and hydrogen electrolysis.



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## Project Focus

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### Saudi Aramco - Hawiyah Gas Plant Expansion

<b>Name of Client</b>	SAUDI ARAMCO - Saudi Arabian Oil Company
<b>Estimated Budget (US\$)</b>	1,200,000,000
<b>Contract Value (US\$)</b>	700,000,000
<b>Award Date</b>	2017-Q4
<b>Main contractor</b>	Saipem
<b>Facility Type</b>	Gas Processing
<b>Status</b>	Construction
<b>Location</b>	Hawiyah, Saudi Arabia
<b>Project Start</b>	2014-Q1
<b>End Date</b>	2022-Q1

### Background

Raising gas production is key to Saudi Arabia's plan to diversify its energy mix. Hawiyah gas plant currently processes 2.5bn scfd of gas. The HGP expansion project is meant to process an additional 1,260 MMSCFD of raw sweet gas from the South Ghawar Region. Hawiyah is part of Aramco's Southern Area Energy Efficiency Program, which includes the development of nine gas compression plants and associated infrastructure to improve the reservoir recovery rate and extend the production plateau of both gas fields by reducing the wellhead pressure. Once completed, the contractors will have installed a 2,900 km of pipelines, which include construction and modification of multiple associated facilities.

### Project Status

Date	Status
Nov 2021	The Hawiyah Gas Plant expansion project has reached advanced stages of construction. The project is expected to be on-stream in 2022.
Mar 2021	Saudi Arabian Fabricated Metals Industry (SAFAMI) has delivered two transition ducts and two 3.1 meters combustion chambers for the project.
Mar 2021	The project's structural, civil, mechanical and electrical work are ongoing. The project has faced several delays due to COVID-19 and will take six more months to reach pre-commissioning stage.
Jun 2020	Saipem has awarded Ampo Poyam Valves a contract to design and manufacture engineered gate valves for the Hawiyah Gas Plant expansion.

### Project Scope

The scope mainly includes:

- Inlet facilities
- Two new gas treatment trains
- Dehydration and dew point control facilities Two sales gas compression units
- High and low-pressure flare and flare recovery systems Steam turbine generation unit
- Expansion of electrical and non-electrical utilities Four new Industrial support buildings
- Communications and network infrastructure for the improvement of gas production and sustainability. Retrofit dehydrator vessels with dual frequency desalting systems.
- SCADA-RTU Systems and backbone connection to support the operation of the nine new Gas Compression Plants (GCPs), seven Liquid Separation Stations (LSSs) and three Operational Support and Administration Areas.
- Reverse Osmosis and STP plants.





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الهيدروجين الأخضر. واستنادا إلى تحليل شركة وود ماكنزي للتكاليف المستقبلية، تحتل كل من أستراليا والشرق الأوسط المرتبة الأولى في مجال الإشعاع الشمسي، وتوفران إمكانات هائلة من الهيدروجين الأخضر. ونظرا لأن تكاليف التحويل والنقل تشكل ما يصل إلى ثلثي تكلفة التجارة الإقليمية للهيدروجين المنقول بحرا، فإن القرب من السوق سيكون مهما أيضا. وبالنسبة للإمداد إلى شمال شرق آسيا على سبيل المثال، يبدو أن الموردين في أستراليا متقدمون عن البقية.

كما أوضح شارما قائلا: «أستراليا، على وجه الخصوص، تبرز من بين الحشود في سجلها الحافل بتصدير مجموعة متنوعة من الموارد الطبيعية والمعادن. هذا بالإضافة إلى النطاق المادي الهائل وموارد الطاقة الشمسية وطاقة الرياح، وكذلك الإمكانات الكبيرة لاحتجاز ثاني أكسيد الكربون وتخزينه على نطاق واسع».

وأضاف شارما: «لن ينجح نهج واحد في أن يناسب الجميع. ففي السوق الناشئة، سيحتاج المشاركون - في مجال الهيدروجين - إلى تبني استراتيجيات ومناهج أعمال قوية ومرنة في نفس الوقت، وتدعم تطورا تحوليا محتملا في تحول الطاقة العالمي. واليوم لدى عدد من البلدان الفرصة لتسخير مواردها، لتصبح - من خلال الهيدروجين - جهة تصدير تتمتع بالهيمنة ولاعبا في تجارة الطاقة منخفضة الكربون».

كما أضاف طومسون قوله: «ومع ذلك، في حين أن حجم طموح هذه البلدان ونجاحها سيؤثر على أنظمة الطاقة العالمية بطريقة غير مسبوقة، تظل المفارقة في أن ديناميكيات التجارة العالمية المستقبلية في الهيدروجين من المرجح أن تبدو مشابهة لتلك الخاصة بالوقود الأحفوري التقليدي. وستكون شمال شرق آسيا - بما في ذلك الصين - وأوروبا من أكبر مستوردي الهيدروجين. في حين تتمتع أستراليا والشرق الأوسط، وربما روسيا والولايات المتحدة، بأكثر إمكانات لتصبح من كبار المصدرين».

من تلك الخاصة بالهيدروجين الأزرق، فإنه من المتوقع أن تنخفض تكاليف الهيدروجين الأخضر مع تحسن تكنولوجيا تصنيع المحلل الكهربائي، وتراجع تكاليف الكهرباء المتجددة. وسيؤدي الانخفاض المتوقع في التكاليف إلى دعم المحور طويل الأجل للتحول من الهيدروجين الأزرق إلى الهيدروجين الأخضر. ومع ذلك، فإن لكل سوق خصائص فريدة ولن يكون انخفاض التكلفة موحدا.

وأضاف طومسون قائلا: «الحقيقة هي أن العالم يحتاج إلى كليهما لتحقيق الوتيرة المطلوبة لإزالة الكربون على الصعيد العالمي. حيث يتمتع إنتاج الهيدروجين الأزرق بميزة قابلية التوسع مقارنة بالهيدروجين الأخضر في الوقت الحالي، ويمكن تطويره بالفعل في الأحجام المطلوبة، على الرغم من أن فترات التسليم أطول».

«معظم المشاريع المقترحة حاليا تمثل مزيجا من الاثنين، ويمكن لجهة تصدير الهيدروجين الأزرق في أستراليا أو الشرق الأوسط على سبيل المثال أن تؤسس موقعا لها في السوق، والتوسع في الهيدروجين الأخضر مع انخفاض التكاليف بمرور الوقت وإتاحة السعة، وبالتالي يمكن للمنتجين بناء سلاسل إمداد الهيدروجين منخفض الكربون الخاصة بهم. إذ يصبح الهيدروجين الأخضر أكثر قدرة على المنافسة بمرور الوقت».

يتمتع الموردون، الذين يمثلون إمكانية الوصول إلى موارد الغاز الرئيسية منخفضة التكلفة وإمكانية احتجاز الكربون وتخزينه، بميزة طبيعية لصادرات الهيدروجين الأزرق. وتبدو مناطق مثل الشرق الأوسط وروسيا والولايات المتحدة، والتي تحظى بتكاليف حفر بيرة تنافسية، في أفضل وضع لتطوير موقع تصدير بين الأقاليم. وستكون البلدان القادرة على استغلال البنية التحتية الحالية للأمونيا في المقدمة.

وبالمثل، فإن الموردين الذين يتمتعون بالقدرة على الوصول إلى مصادر الطاقة المتجددة منخفضة التكلفة، سوف يقلبون الموازين عندما يتعلق الأمر بإنتاج

الهيدروجين المنقولة بحرا، و23 مليون طن (16 في المائة من إجمالي تجارة الطاقة المنقولة بحرا)، على التوالي.

## مشاريع الهيدروجين العملاقة

يأمل العديد من الدول الاستفادة من تطوير مشاريع الهيدروجين العملاقة الموجهة للتصدير، مع تطوير مشاريع الهيدروجين الأزرق والأخضر في روسيا وكندا وأستراليا والشرق الأوسط. ويوجد منطقة الهيدروجين الخضراء المزدهرة ما يقرب من 60 في المائة من مشاريع التصدير المقترحة في الشرق الأوسط وأستراليا، وتستهدف بشكل أساسي الأسواق في أوروبا وشمال شرق آسيا. وخلال فترة الـ 12 شهرا الماضية، كانت هناك زيادة بمقدار 50 ضعفا في مشاريع الهيدروجين الأخضر المعلن عنها وحدها.

سيتم جذب مطوري المشاريع والمقرضين والمشتريين إلى مواقع لها سجل حافل من تصدير الموارد الطبيعية. هذا بالإضافة إلى الظروف المناسبة للكهرباء المتجددة منخفضة التكلفة وإمكانية احتجاز الكربون على نطاق واسع. ويتطلع العديد من الدول إلى انتزاع نصيب أكبر من حصة تجارة الهيدروجين. فقد أعلنت كل من المملكة العربية السعودية والبرازيل وتشيلي وسلطنة عمان وكازاخستان عن مشاريع عملاقة تستهدف سوق التصدير. في حين أن دولا أخرى مثل روسيا وكندا، لديها موارد هائلة غاز منخفضة التكلفة، وقدرة كبيرة على احتجاز الكربون وتخزينه.

وقال نائب رئيس مجلس الإدارة جافين طومسون: «نتيجة لعدم وجود تشابه بين أي مشروعين لتصدير الهيدروجين، فإن الاختلاف الأكثر وضوحا في المشاريع المقترحة هو بين الهيدروجين الأزرق والأخضر. ولكن تصوير هذا الأمر على أنه اختيار بين أمرين لا ثالث لهما هو تبسيط مبالغ فيه».

وعلى الرغم من أن التكاليف الحالية لإنتاج الهيدروجين الأخضر عادة ما تكون أعلى بثلاث مرات

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## السباق نحو الريادة في تجارة الهيدروجين العالمية

تقول شركة وود ماكنزي لاستشارات الطاقة، إنه في الوقت الذي يتطلع فيه كبار مصدري الطاقة في العالم إلى الإسراع نحو انتقالها، بالإمكان أن يُحدث التقدم في تجارة الهيدروجين فارقاً، في حين تعتبر منطقة الشرق الأوسط واحدةً من أفضل المناطق المؤهلة لأن تصبح مصدر تصدير كبيراً.

2050، زيادة الطلب العالمي على الهيدروجين بنسبة تصل بين ضعفين وستة أضعاف في ظل سيناريوهات توقعات انتقال الطاقة والتحول السريع لها. وقد يصل الطلب على الهيدروجين منخفض الكربون إلى ما يصل إلى 530 مليون طن بحلول عام 2050، مع ما يقرب من 150 مليون طن في السوق المنقولة بحراً، وذلك وفقاً لسيناريو: التحول السريع للطاقة - 1.5 - الاحترار 1.5 درجة مئوية.

يمكن أن يمثل الطلب على استيراد الهيدروجين منخفض الكربون من شمال شرق آسيا وأوروبا حوالي 80 مليون طن أي ما يعادل 55 في المائة من تجارة

الطاقة المتجددة لخفض الانبعاثات وتعزيز أمن الطاقة، تتطلع البلدان والصناعات الآن إلى أنواع الوقود والمواد الخام الأولية التي تعتمد على الكهرباء، حيث يمكن في هذه الحالة أن يكون الهيدروجين هو العامل الذي يغير قواعد اللعبة. وأحد أهم العوامل الرئيسية، التي تميز هذا الاتجاه، هو الإمكانيات الهائلة للهيدروجين في أسواق الطاقة المتداولة. ومن المتوقع أن يمثل الهيدروجين منخفض الكربون ومشتقاته حوالي ثلث تجارة الطاقة المنقولة بحراً في عالم خالٍ من الانبعاثات عام 2050.

وتتوقع شركة وود ماكنزي، من الآن وحتى عام

بلغت قيمة سوق الطاقة العالمية في عام 2020 ما يعادل 2 تريليون دولار أمريكي، مما ساهم في أكثر من 9 مليارات طن من انبعاثات مكافئ ثاني أكسيد الكربون (CO<sub>2</sub>e). وفي العام نفسه، أنتجت أكبر خمس دول مصدرة للطاقة (وهي المملكة العربية السعودية وروسيا وأستراليا والولايات المتحدة الأمريكية واندونيسيا) أكثر من نصف إجمالي الطاقة المتداولة. وقد أشار براكاش شارما، مدير الأبحاث بشركة وود ماكنزي إلى أنه «من المقرر أن تشهد تجارة الطاقة العالمية أكبر اضطراب لها منذ السبعينيات وصعود منظمة البلدان المصدرة للبترول (أوبك)». «وبالإضافة إلى الاستثمار في مصادر

المحررة: لويز ووترز

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فاكس: +44 (0) 7876 0076

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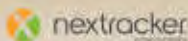
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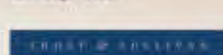
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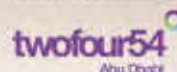
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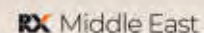
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