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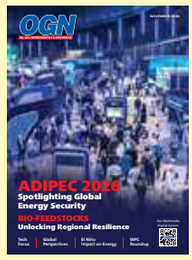
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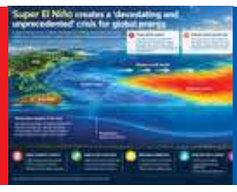
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ENERGY LEADERS CONFRONT GEOPOLITICAL PRESSURES



Leaders at ADIPEC will aim to secure economic stability in the energy markets

ADIPEC 2026 shifts focus from long-term ambitions to immediate technical implementation

BY ABDULAZIZ KHATTAK

RISING geopolitical tensions, rapid industrial expansion, and soaring artificial intelligence (AI) power demands are accelerating the global shift towards pragmatic energy solutions.

Against this backdrop, industry leaders attending ADIPEC 2026 from November 2-5 in Abu Dhabi, UAE, are pivoting decisively from distant targets to practical implementation across conventional and emerging energy sectors.

To address these immediate pressures, the primary objective of the gathering centres on securing economic stability through immediate, resilient energy framework enhancements across international markets.

Chief among these challenges are the rapidly growing power needs driven by data centres and advanced computing, which are placing unprecedented strain on legacy digital and physical infrastructure.

Bridging this widening gap between current systems and future requirements will require robust supply chain resilience, strategic capital deployment, and extensive network modernisation.

In this evolving landscape, AI is serving a dual role. It's acting simultaneously as a major driver of energy demand and an essential tool for operational optimisation.

ADIPEC FEATURE PAGES 2-49

Meanwhile, oil and gas production remains fundamental to international market stability, even as companies concurrently invest in carbon management, hydrogen, and advanced grid technologies. At the same to time, expanded participation from Asian markets highlights shifting global demand dynamics and the growing strategic influence of regional national energy entities.

To support these dual priorities, substantial financial investment must target not only new infrastructure construction but also the complex modernisation of interconnected, digitalised existing distribution networks.

The conference reflects this urgent technical mandate, bringing together over one thousand expert speakers to examine practical methodologies for operational efficiency and emissions reduction.

Ultimately, by fostering strategic cross-border partnerships, global industry stakeholders aim to fortify supply networks, mitigate ongoing market volatility, and guarantee sustainable long-term economic growth. ■

Global diesel shortage threatens winter energy security

A severe global diesel deficit is threatening energy security as severely constrained middle distillate supplies push product markets into extreme pressure ahead of winter.

According to a report by the International Energy Agency (IEA), global diesel and gasoil availability dropped by 1.5 million barrels per day (bpd) in the second quarter and 1.7 million bpd in the third quarter of 2026.

This acute shortage stems primarily from persistent Middle East export disruptions, lower Russian output caused by Ukrainian drone strikes on refineries, and reduced Asian processing due to crude supply bottlenecks and soaring freight rates.

These record price surges are already worsening economic conditions worldwide by inflating freight and delivery costs, driving up inflation, and depressing real household incomes.

Chris Wright, US Energy Secretary, told Bloomberg that no Russian Diesel has been released yet and yet to be seen if Russia will release diesel

He added that "the situation in Ukraine must change" for Russia to export diesel and continue doing so.

Wright also called on Europe to release more from its reserves.

Despite weakening global demand, on-land inventories have fallen counter-seasonally to their lowest levels since 2016, leaving markets without crucial stock cover for peak seasonal heating.

A full recovery in gasoil inventories is unlikely before mid-2027, leaving the system vulnerable to further market turmoil unless Middle Eastern exports rebound or accelerated demand destruction balances the market. ■

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The expanded AI Zone will showcase real-world applications of AI across the energy value chain

ENERGY SECURITY REMAINS PARAMOUNT AS GLOBAL LEADERS GATHER FOR ADIPEC

Global leaders will converge in Abu Dhabi to tackle surging global demand, critical infrastructure resilience, and artificial intelligence integration across regional energy markets, Thomas Loffler tells *OGN*

BY ABDULAZIZ KHATTAK

As the global energy landscape navigates mounting geopolitical shifts, rapid industrialisation, and surging power demands from artificial intelligence (AI), industry leaders are shifting their focus firmly from long-term ambitions to practical implementation.

This year's ADIPEC being held from November 2-5, and organised by dmg events, highlights a critical paradigm where conventional resources and emerging technologies must work in tandem to secure reliable economic growth while accelerating decarbonisation pathways across international markets.

To bridge the gap between current energy systems and future requirements, stakeholders are confronting complex challenges surrounding supply chain resilience, capital investment, and infrastructure modernisation.

In an exclusive interview with ***OGN*** energy magazine, Thomas Loffler, Executive Vice-President, dmg events, says: "The central message behind ADIPEC 2026 is simple: energy security is economic stability."



Thomas Loffler

Beyond traditional production frameworks, the conference highlights how emerging technologies and expanded international participation are redefining industry standards.

By fostering cross-sector partnerships between policymakers, investors, and engineers, the platform aims to unlock actionable solutions that strengthen energy networks and support long-term economic prosperity worldwide.

Below are excerpts from the interview:

How have dmg events and ADIPEC responded to the regional tensions in the organisation of the event?

Recent events have been a reminder of how interconnected energy, economic growth and geopolitics have become.

They have also reinforced the importance of platforms where industry leaders, policymakers and investors can come together, exchange perspectives and build the partnerships needed to navigate uncertainty.

As preparations for ADIPEC 2026 continue, our priority remains delivering a safe, productive and professional environment for participants from around the world.

We have also evolved this year's conference agenda to reflect the issues now at the forefront of industry discussions, including energy security, infrastructure resilience, supply

chain reliability and investment.

The past year has highlighted the growing gap between the energy system we have today and the one we'll need in the future.

ADIPEC provides a platform for the conversations and collaborations required to build more resilient, reliable and adaptable energy systems while supporting long-term economic growth.

What is the central theme shaping ADIPEC 2026?

The central message behind ADIPEC 2026 is simple: Energy security is economic stability.

Around the world, the demand for energy is growing, supply chains are evolving, geopolitical uncertainty remains a factor and new technologies, such as AI, are changing the way energy is produced, distributed and consumed.

Together, these shifts are placing new demands on systems that were designed for a very different era.

Reliable energy underpins everything from industrial growth and manufacturing to digital infrastructure and economic competitiveness.

At the same time, countries are pursuing different pathways to reduce emissions and build more sustainable energy systems.

The challenge is not choosing between today's energy needs and tomorrow's ambitions; it is finding practical ways to advance both.

ADIPEC 2026 will focus on how industry, governments and technology leaders can work together to strengthen energy security while investing in the infrastructure, innovation and skills that will power future growth.

Why is this conversation particularly relevant now?

We are entering a period of significant transformation for the global energy system.

Demand continues to rise across both developing and developed economies, driven by population growth, industrialisation, urbanisation and the rapid expansion of energy-intensive technologies, such as AI, data centres and advanced manufacturing.

At the same time, the way energy is produced, traded and delivered is becoming increasingly complex; supply chains are more interconnected, technology is advancing at an unprecedented pace and governments are placing greater emphasis on resilience and long-term energy security.

Meeting future demand while continuing to reduce emissions will require substantial investment, large-scale technology deployment and stronger collaboration across industries.

That's why platforms like ADIPEC matter; they bring together decision-makers from across the energy ecosystem to focus on practical solutions, unlock investment and accelerate the partnerships needed to deliver the next generation of energy systems.

What role does the oil and gas sector continue to play in this environment?

Oil and gas remain fundamental to global energy security and economic stability.

While investment in renewable energy and emerging technologies continues to grow to meet global need for diverse sources of energy, the world still relies heavily on conventional energy resources to power industry, transportation, manufacturing and petrochemicals.

The challenge is not replacing one source of energy with another; it is ensuring that societies have access to reliable, affordable energy while continuing to lower emissions.

That is why many energy companies are expanding their focus beyond production, and they are investing in AI, digital technologies, carbon management, hydrogen, energy storage and other solutions that can improve efficiency, strengthen resilience and reduce environmental impact.

ADIPEC provides an important forum for discussing how conventional and emerging energy systems can work together as part of a more integrated and resilient energy future.

As AI becomes a major industry topic, how will AI feature at ADIPEC 2026?

AI is rapidly becoming one of the most influential technologies shaping the future of energy.

It is already helping companies optimise production, improve asset performance, strengthen maintenance programmes and support faster decision-making.

At the same time, the growth of AI itself is creating significant new energy demand through data centres, advanced computing and digital infrastructure.

That makes AI both an energy solution and an energy challenge.

It is transforming how companies operate while also increasing the need for secure, reliable and scalable energy supplies.

At ADIPEC 2026, AI will be a central theme across both the conference and exhibition.

The AI, Digital and Technology Strategic Conference will explore how organisations are moving beyond pilot projects and embedding AI into day-to-day operations, while our AI Leadership Roundtables will bring together leaders from energy, technology, policy and finance to discuss deployment, investment and governance.

On the exhibition floor, the expanded AI Zone will showcase real-world applications of AI across the energy value chain, from predictive maintenance and automation to advanced analytics, data management and cyber resilience.

The objective is to move the conversation from potential to implementation and demonstrate how AI can deliver measurable value today.

Infrastructure investment is another priority for many energy companies. Why is it such a critical issue?

Infrastructure sits at the heart of energy security.

Whether it's pipelines, export terminals, power networks, storage facilities, refineries or digital systems, infrastructure determines how reliably energy can move from source to consumer.

What makes today's challenge different is that we're not only building new infrastructure, we're also modernising existing systems.

Energy networks are becoming more interconnected, more digital and more complex.

Integrating AI, advanced grid management, storage technologies and carbon management solutions requires substantial investment alongside traditional infrastructure development.

This means the conversation is no longer just about capacity. It's about resilience, flexibility and future-readiness.

At ADIPEC, industry leaders, investors and policymakers will examine how to accelerate infrastructure deployment, unlock capital and develop the integrated energy systems needed to support long-term economic growth.

What can delegates expect from the ADIPEC Technical Conference?

The Technical Conference is where strategy meets execution.

While many discussions focus on long-term ambitions, the Technical Conference focuses on the engineering, technologies and operational expertise needed to deliver them.

By bringing together the SPE Technical Programme and the Downstream Technical Programme, ADIPEC creates a unique platform where upstream, downstream, digital and integrated value chain experts can share knowledge and solve common challenges.

Across more than 200 sessions and with over 1,100 expert speakers, delegates will explore practical solutions across areas including operational efficiency, advanced materials, digitisation, emissions reduction, AI and next-generation energy technologies.

The record number of submissions we received this year reflects both the pace of innovation across the industry and the growing importance of technical collaboration in delivering future energy systems.

What else is new at ADIPEC 2026?

ADIPEC 2026 has evolved to reflect the new realities shaping the global energy sector.

One of the biggest developments is the significant growth in participation from Asia.

As the region driving much of the world's future energy demand, Asia is playing an increasingly influential role in energy markets, infrastructure investment and technology adoption.

This year's event will welcome a larger presence of government leaders, national energy companies, industrial organisations and investors from across the region.

We have also expanded and refreshed the conference programme to address the issues that matter most to industry today, including AI, industrial resilience, infrastructure development, capital investment and long-term energy security.

The focus throughout is on real-world solutions and practical implementation rather than theoretical discussions.

In addition, we have reconfigured parts of the exhibition and event layout, including hosting the Opening Ceremony at an external location, to accommodate continued growth while providing a better experience for attendees and exhibitors.

How important is collaboration in addressing future energy challenges?

Collaboration has never been more important because today's energy challenges do not exist in isolation.

The industry is navigating rising demand, shifting supply dynamics, geopolitical uncertainty, changing trade relationships and the rapid growth of technologies such as AI and large-scale data infrastructure.

Addressing these challenges requires expertise, investment and innovation from across multiple sectors.

No single company, government or technology can deliver the energy systems of the future alone.

Progress will depend on stronger partnerships between energy producers, technology companies, investors, engineering organisations, policymakers and research institutions. This is where ADIPEC plays a unique role.

By bringing together stakeholders from across the global energy ecosystem, it creates opportunities for the conversations, partnerships and investment decisions that help move projects from ambition to implementation.

Many of the collaborations that shape the future of energy begin with discussions that take place at ADIPEC. ■

Strategic realignment defines ADIPEC as energy security takes centre stage

Global energy leaders to confront mounting geopolitical turbulence, infrastructure vulnerabilities, and structural demand growth across international markets



The newly restructured ADIPEC Strategic Conference reflects the shifting realities of the global energy landscape

GLOBAL energy leaders converge on Abu Dhabi from November 2-5 to confront mounting geopolitical turbulence, infrastructure vulnerabilities, and structural demand growth across international markets.

ADIPEC highlights the Middle East's role in global energy supply and its growing influence through investments in natural gas, renewable energy, chemicals, and infrastructure.

Taking place at the Abu Dhabi National Exhibition Centre, the event is held under the patronage of His Highness Sheikh Mohamed bin Zayed Al Nahyan, President of the UAE, and hosted by ADNOC.

Organisers dmg events expect 239,000 attendees from more than 170 countries, alongside over 2,250 exhibiting companies across 16 halls, 1,800 speakers, and 30 country pavilions.

Abdulmunim Saif Al Kindy, Chair of ADIPEC, stated: "This year's ADIPEC comes at a defining moment for the global energy industry. We face the challenge of a more disrupted and exposed system, meeting a more energy intensive economy. But, while shocks and conflicts disrupt the system, the world needs more energy, in more forms, delivered more reliably to meet rising demand. And we need the investment, advanced technology and partnerships to make that happen. That is the agenda for action at ADIPEC 2026."

Confirmed regional and international leaders attending include Suhail Al Mazrouei, UAE Minister of Energy and Infrastructure, and Karim Badawi, Egypt's Minister of Petroleum and Mineral Resources.



Other participating ministers include Saleh Kharabsheh from Jordan, Dr Mohamed bin Mubarak Bin Daina from Bahrain, Joseph Al-Saadi from Lebanon, and Dr Khalifa Rajab Abdulsadek from Libya.

International participants feature Katharina Reiche, Federal Minister for Economic Affairs and Energy from Germany, Dr Alparslan Bayraktar from Türkiye, and Takagi Kei from Japan, alongside Jassim Alshirawi, Secretary General of the International Energy Forum.

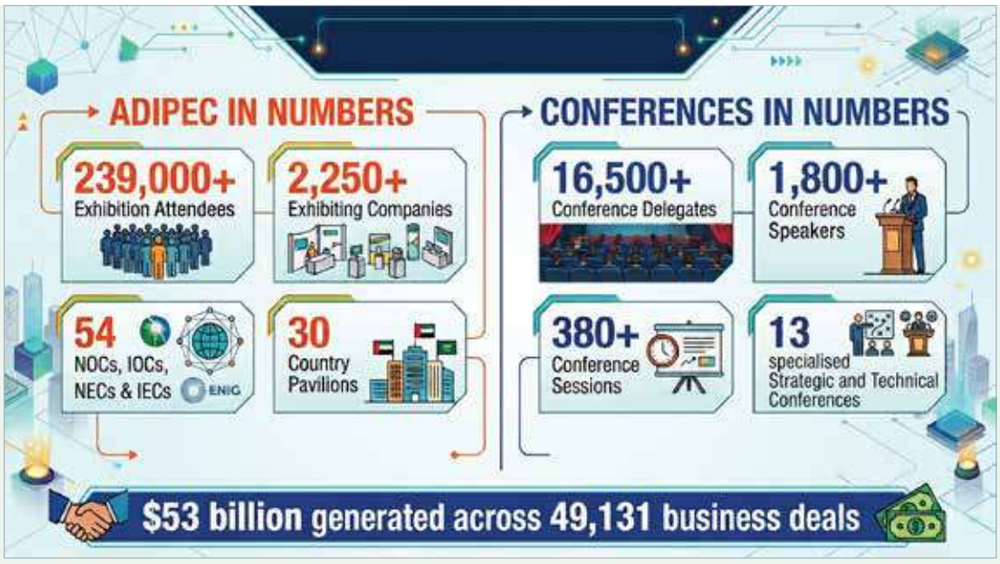
NEW STRATEGIC ADDITIONS

The newly restructured ADIPEC Strategic Conference reflects the shifting realities of the global energy landscape, where mounting demand, geopolitical volatility, and infrastructure pressures demand a move from high-level dialogue to concrete execution.

To tackle these complex challenges head-on, the conference has introduced six new dedicated pillars designed to align international priorities, accelerate investment decisions, and strengthen system-wide resilience.

»


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- The Energy Security and Resilience conference convenes ministers, energy producers, utilities, infrastructure operators, security experts, and investors to shift resilience from a defensive priority to a core pillar of energy strategy.

  Discussions will centre on preparedness for external shocks, contingency planning, system flexibility, infrastructure protection, supply chain resilience, and practical measures to absorb disruption while maintaining affordability and reliability.
- The Policy, Regulation & Governance conference brings together ministers, regulators, private sector executives, investors, legal experts, multilaterals, and strategic advisers to address the friction between growing market complexities and lagging regulatory frameworks.

  Discussions will focus on establishing regulatory certainty, market design, permitting reform, institutional coordination, and governance models that accelerate capital deployment and project delivery.
- The Upstream conference convenes operators, independents, investors, EPCs, and technology leaders to reinforce supply continuity and convert resources into resilient production amid geopolitical pressure and tighter capital discipline.

  Discussions will centre on portfolio architecture, partnership models, recovery optimisation, contingency readiness, project delivery, and technological deployments that enhance asset performance and capital efficiency.
- The Clean Power, Molecules & Carbon Management conference will gather energy producers, project developers, off-takers, traders, policymakers, and investors to shift low-carbon technologies and cleaner molecules from policy-led aspiration to delivery-led discipline.

  Discussions will focus on project bankability, molecule infrastructure, trade corridor development, market design, industrial decarbonisation, manufacturing competitiveness, and regulatory frameworks required to scale renewables, hydrogen, nuclear, and CCUS.
- The Grids, Infrastructure & Industrial Execution summit will address physical bottlenecks in energy delivery by bringing together grid operators, utilities, infrastructure developers, EPC contractors, industrial manufacturers, technology providers, and investors.

  Discussions will centre on grid modernisation, midstream and offshore infrastructure expansion, energy storage, critical mineral supply chains, port readiness, permitting reform, and procurement strategies necessary to build integrated physical systems.
- And the Workforce & Skills conference will convene senior energy executives, operators, project leaders, technology providers, and workforce decision-makers to address cross-sector talent friction, generational shifts, and severe role shortages across complex operations.

Discussions focus on leadership succession, knowledge transfer, localisation strategies, cross-sector talent mobility, and building workforce readiness for digital and AI-enabled operations to sustain long-term system performance.

These six new focus areas operate alongside five established strategic streams, including Finance & Investment; AI, Digital & Technology; Natural Gas & LNG; Maritime & Logistics; and Downstream, Chemicals & Industrial Value Chains.

All together, these complete the 11-programme agenda designed to address capital deployment, digital transformation, fuel flexibility, supply chain integrity, and industrial integration.

Beyond the strategic discussions, ADIPEC integrates practical technical expertise, immersive technology showcases, and elite networking channels to drive comprehensive industry alignment.

The Technical Conference delivers field-proven engineering solutions across upstream system performance, refining, and chemical processing, while the dedicated ADIPEC Exhibitions, featuring specialised AI, Digitalisation, Maritime & Logistics, and Low Carbon & Chemicals zones, allow providers to demonstrate scalable applications ranging from predictive analytics and robotics to hydrogen and carbon capture networks.

High-level alignment is further reinforced through the invitation-only Global Energy Club and the Chatham House Rule Leadership Roundtables, where ministers, CEOs, and investors candidly align on policy, capital mobilisation, and strategic priorities, while the Young ADIPEC initiative develops STEM-focused talent to support the next generation of energy leadership.

Together, these interconnected conference streams, technical showcases, and executive forums consolidate ADIPEC's position as the premier global platform for aligning policy, mobilising capital, and driving real-world execution across the modern energy ecosystem. ■

Record Asian participation at ADIPEC

ADIPEC 2026 is welcoming its strongest-ever participation from Asia, with 353 companies and 10 national pavilions from China, India, Indonesia, Kazakhstan, Japan, Malaysia, Singapore, Pakistan, South Korea and Turkmenistan joining the event in Abu Dhabi from November 2-5.

Participating companies include Sinopec, CNPC, CNOOC, Petronas, PTTEP, INPEX, Mitsubishi Heavy Industries, Mitsui, GS Energy Corporation, CATL, Envision Energy and Bajaj Power Equipment.

Asia's growing role in global energy markets comes as the region is expected to account for a significant share of worldwide energy demand growth over the coming decades.

China is forecast to represent close to half of global electricity demand growth through 2030, while India is expected to remain the largest contributor to global energy demand growth through 2035.

The resulting demand is expected to require substantial investment in energy supply, electricity generation, infrastructure and more resilient energy systems, particularly as data-centre capacity and digital economies expand.

Abdulmunim Saif Al Kindy, Chairman, ADIPEC 2026, said: "Asia is at the centre of global energy demand growth. As economies expand and energy needs rise, meeting that demand will require greater collaboration between producers, buyers, investors and technology leaders, alongside continued investment in supply and capacity. That is why ADIPEC is attracting record participation from across Asia, providing a platform where strategies are advanced, partnerships are formed and opportunities are turned into action."

Confirmed Asian speakers include Wang Yuetao, Chairman of ZhenHua Oil; Takayuki Ueda, Representative Director, President & CEO of INPEX; Rajarshi Gupta, MD & CEO of ONGC Videsh; Prof. Haruhiko Ando, CEO of Japan Cooperation Centre for Petroleum and Sustainable Energy; Charlotte Wolff-Bye, VP & Group Chief Sustainability Officer at Petronas; Prashant Ruia, Group CEO of Essar Group; and Koji Yamamoto, CTO and Senior Councilor of JOGMEC.

The conference agenda will address several issues directly relevant to Asia's energy requirements, including the Natural Gas & LNG programme; Grids, Infrastructure and Industrial Execution programme; Finance & Investment programme; and The Maritime & Logistics programme.

New Leadership Dialogues will further examine regional priorities, including a session titled 'Asia's power squeeze: integrating renewables and gas in high-growth power systems' and a Boardroom Roundtable on 'The new technology frontier: Asia's role in shaping global innovation'.

Christopher Hudson, President, dmg events, the organisers of ADIPEC, said: "Asia's influence on the global energy system now extends far beyond demand. The region is increasingly shaping technology, manufacturing, infrastructure and the commercial relationships behind the industry's next phase of growth."

"ADIPEC has always evolved with the industry, responding each year to where the biggest shifts are happening and where the greatest opportunities lie. Our role is to create the platform where those changes can be translated into decisions, partnerships and progress." ■

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In doing so, we're redefining the future of industrial workflows and advancing the sustainability of our partners and society.



Co-innovating tomorrow is either a registered trademark or trademark of Yokogawa Electric Corporation.

Sealless canned motor pumps boost operational reliability of SRUs

Hermetically sealed pump designs utilise advanced axial thrust balancing and rugged hydrodynamic bearings to safely handle hazardous and corrosive refinery fluids

SULPHUR recovery units (SRUs) play a critical role in modern gas processing and refining facilities, and while sulphur production is the ultimate objective, reliable handling of numerous auxiliary process fluids is equally important for safe and efficient operation.

Within Claus units, canned motor pumps are frequently used for sour water, wash water, reflux, condensate and other critical duties where containment and reliability are essential.

Many SRU fluids contain dissolved hydrogen sulphide (H_2S), corrosive compounds, hydrocarbons or contaminated water.

Continuous operation and strict environmental requirements make process containment a key design criterion.

The hermetically sealed design eliminates mechanical seals and, therefore, removes the principal dynamic leakage path found in conventional centrifugal pumps.

This supports improved safety, lower emissions and reduced maintenance.

Modern canned motor pumps can be supplied in accordance with API 685 for sealless centrifugal pumps and are commonly designed around ISO 15783 requirements.

Hydraulic designs can also be based on ISO 2858 dimensions where applicable, facilitating integration into industrial process plants.

A key component of Hermetic canned motor pumps is the hydrodynamic slide bearing system operating in the pumped liquid.

During normal operation, there is no metal-to-metal contact.

Hermetic commonly utilises a proven bearing combination consisting of tungsten carbide coated bearing sleeves (W5) and silicon carbide bearing bushings (SiC30).

This combination provides excellent wear resistance, chemical resistance, thermal shock resistance and long service life, while remaining essentially maintenance-free under normal operating conditions.

ADVANCED AXIAL THRUST BALANCING TECHNOLOGY

One of the key engineering challenges in canned motor pump design is the management of axial thrust forces acting on the rotor assembly.

Unlike conventional pump arrangements that may rely on dedicated thrust bearings, Hermetic canned motor pumps utilise a hydraulic balancing concept specifically developed to continuously compensate axial forces during operation.

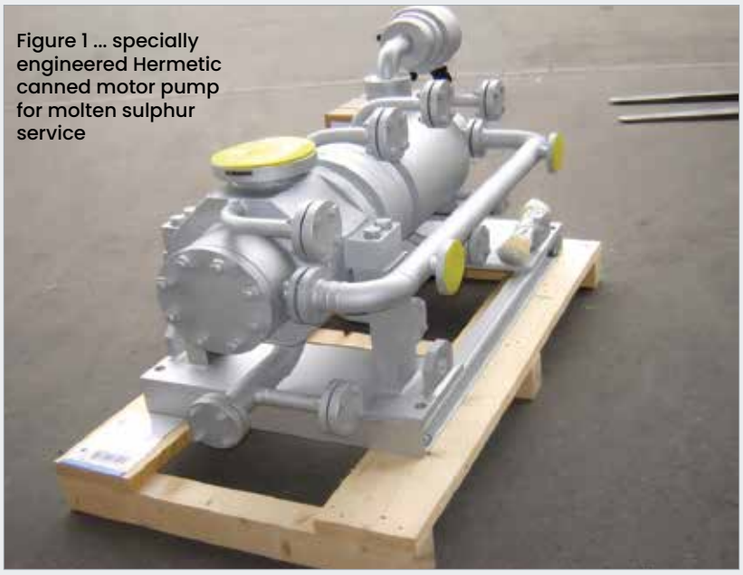


Figure 1 ... specially engineered Hermetic canned motor pump for molten sulphur service

The Hermetic balancing system is based on a variable throttling arrangement integrated into the balancing disc.

As the rotor position changes, the pressure inside the compensation chamber automatically adjusts, creating a self-regulating hydraulic balancing effect.

This design offers several advantages:

- Continuous automatic axial thrust compensation.
- Reduced load on bearing components.
- Improved rotor stability.
- Minimised wear during operation.
- Extended equipment lifetime.
- Enhanced reliability in continuous process applications.

By maintaining a balanced operating condition throughout the pump's operating range, the system contributes significantly to the long service life and operational reliability expected in demanding refinery, petrochemical and gas processing environments.

Typical applications include sour water pumps, wash water circulation pumps, reflux pumps, condensate transfer pumps and other auxiliary services where fugitive emissions and maintenance must be eliminated.

In large gas processing and refining facilities across the Middle East and worldwide, operators continue to rely on sealless technology to support long-term operational performance, process safety and environmental objectives.

BEYOND AUXILIARY SERVICES: MOLTEN SULPHUR TRANSFER

In addition to Claus process services, canned motor pumps can also be engineered for molten sulphur applications.

These designs incorporate dedicated thermal management and heating arrangements to prevent sulphur solidification and ensure reliable operation in one of the most demanding services within a sulphur recovery plant (*Figure 1*).

Specially engineered Hermetic canned motor pump for molten sulphur service.

Hermetic-Pumpen is a leading developer and manufacturer of hermetically sealed pumping technologies.

Recognised worldwide for its expertise in canned motor pump technology, HERMETIC has built a strong reputation for providing safe, reliable and long-lasting solutions for demanding industrial applications involving hazardous, toxic, corrosive and environmentally sensitive fluids.

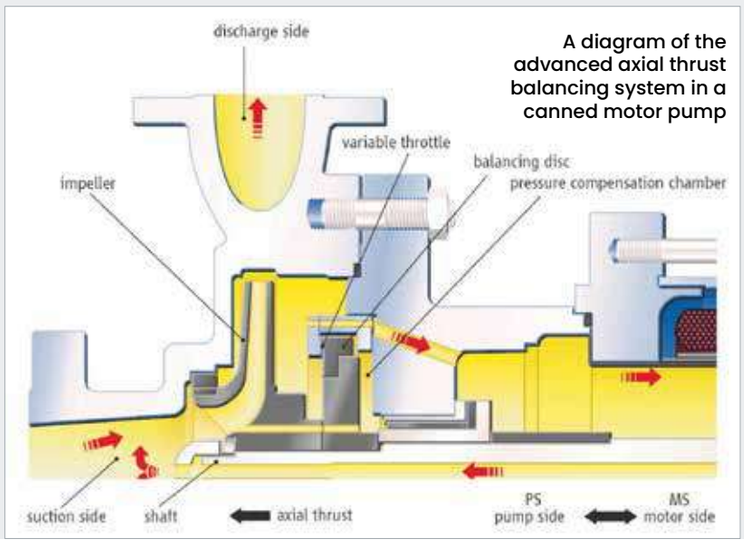
Hermetic pumps are designed to operate under some of the most challenging process conditions encountered in the oil and gas, petrochemical, chemical and energy industries, covering fluid temperatures from -160 deg C up to +480 deg C and system pressures up to 120 MPa.

With power ratings ranging from 1 kW to 690 kW, Hermetic offers one of the broadest canned motor pump portfolios available on the market, including solutions for refinery processes, gas processing facilities, sulphur recovery units, LNG applications and other critical services requiring maximum process containment.

Headquartered in Germany, Hermetic employs approximately 400 people and maintains subsidiaries in China and the US.

Together with its global network of service centres and authorised partners, the company provides comprehensive support throughout the entire lifecycle of industrial installations, from project engineering and commissioning to maintenance and aftermarket services. ■

HERMETIC-Pumpen is exhibiting at Stand 8718, Hall 8.



A diagram of the advanced axial thrust balancing system in a canned motor pump



Global energy resilience through LNG

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G8 meets zone intelligence: Blackline Safety unveils new tech at ADIPEC

Advanced geofencing and real-time electronic mustering software transform complex regional emergency response procedures and daily workforce monitoring for major energy operators

BLACKLINE Safety is bringing its newest portable gas detector to the Gulf's biggest energy stage, ADIPEC, this November.

G8, the most connected safety wearable ever made, combines multi-gas detection, lone-worker monitoring, GPS location and push-to-talk communication in a single, intrinsically safe device.

By bringing multiple layers of protection and communication together, G8 can help operators understand their worksites better, improving both day-to-day operational efficiency and worker safety.

Since shipping began in March, G8 has already picked up multiple industry safety awards, and the team is looking forward to demonstrating it for the first time in the Middle East, alongside the popular G6 single-gas detector, and EXO 8 area monitor, which are already helping organisations manage worker safety in the region.

But G8 isn't the only new technology Blackline is bringing to Abu Dhabi. The company will also showcase its new ZoneAware™ geofencing functionality now available across all its portable gas detection and lone worker devices, through Blackline Live software.

This zone intelligence capability adds operational context to location data, helping energy companies understand where workers are, how they are moving through a site, where activity is concentrated, and where previously manual safety process can be automated or simplified.



The G6 single-gas detector gives workers continuous, connected protection against a specific gas hazard, such as H_2S

ADDING SITE CONTEXT WITH ZONE INTELLIGENCE

ZoneAware™ builds on industrial geofencing by enabling organisations to draw, name, and manage digital zones across a live map of their worksite.

These zones represent real operational areas, such as muster points, confined spaces, gas collection areas, break areas, access roads, or hazardous high-risk areas.

As connected safety devices move through these zones, their location data is automatically tied to context.

Instead of seeing only raw coordinates, teams can understand activity in terms that reflect how the site actually operates.

While ZoneAware™ is relevant across industries, its true value becomes more evident when you see how it plays out in real operational scenarios, with streamlined mustering during drills and real evacuations a real benefit across oil and gas, petrochemical processing and large infrastructure projects, where mustering has traditionally relied on paper roll calls, supervisor headcounts and radio coordination.

While that model holds up on a small site, it strains on a super-complex, a sprawling pipeline network, or any operation where crews and contractors are spread across long distances, remote valve stations and multiple simultaneous work fronts.

With ZoneAware™, muster zones are clearly defined on the map.

When an alert is triggered, safety leads can instantly see how many workers are in evacuation zones versus muster points. Workers check in automatically when they enter the muster zone with their devices.

The result is a continuously updated muster list showing who is on site, where they are, and whether they've reached the assembly point, replacing a manual headcount with automated accountability.



During a drill or real evacuation, workers check in automatically when they reach a muster zone, giving safety leads a live headcount instead of a manual roll call

FROM EMERGENCY RESPONSE TO EVERYDAY OPERATIONS

The same zone-based visibility extends beyond emergency response into daily operations.

Teams can maintain live headcounts, monitor occupancy and entry and exit points, understand how workers are distributed across a facility, and track activity within high-hazard areas without relying on the same level of manual checks.

That means better situational awareness for HSE teams, but also less administrative work, faster coordination, and better operational visibility across complex worksites.

It also creates a clearer record of how a site is actually being used. Over time, occupancy and movement data can help teams identify patterns, investigate recurring issues, and provide evidence for process improvements.

AlertLink, a complementary feature, pushes proximity-based alerts directly to workers' devices when they move near a defined hazard, closing the loop between detection and field-level response.

For Middle East operators managing contractor-heavy workforces across fixed facilities and distributed assets, the convergence of personnel safety and operational visibility is becoming increasingly important. Knowing where people are, and how close they are to gas or other hazards is becoming less a differentiator, more an expectation.

A GROWING MIDDLE EAST COMMITMENT

This November marks Blackline's eleventh consecutive year at ADIPEC, and its presence in the Middle East deepens year on year.

In August 2025, the company began rollout of a multi-year purchase agreement with ADNOC covering up to 28,000 devices, with thousands of connected gas detectors and location beacons now in the field.

A dedicated Abu Dhabi office to support energy, utilities and petrochemical customers is also being fitted out — signalling the company's long-term regional commitment.

SAFETY AS A SUSTAINABILITY METRIC

For an industry under pressure to demonstrate ESG credibility, the numbers are worth noting.

Blackline's platform now protects more than 165,000 workers across 75-plus countries, with its 24/7 Safety Operations Centre monitoring over 64,000 devices at an average alert response time under 60 seconds.

The company also sources 45 per cent of its own energy from renewables, holds ISO 14001 certification, and has grown its e-waste recycling by nearly 40 per cent year over year.

Blackline Safety will showcase Zone Intelligence, e-mustering and real-time head counting at ADIPEC, alongside its G6, G8 and EXO 8 connected safety portfolio.

With large-scale energy and industrial projects becoming increasingly complex, solutions that provide continuous visibility of personnel, hazards and site activity are moving from operational advantage to operational necessity, reflecting a broader shift towards connected safety across the region's industrial sector. ■

Blackline Safety is exhibiting at Hall 2, Stand 2460, in the Canada Pavilion.


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MERYT chemicals expands footprint with advanced industrial materials

The company's Abu Dhabi hub leverages Spanish R&D expertise to deliver tailored catalysts, adsorbents, and scalable metal-organic framework technologies for regional process industries

MERYT Chemicals is expanding its activities across the Middle East from its base in Abu Dhabi, supported by the group's technical and R&D capabilities housed at MERYT Catalysts and Innovation in Spain.

The UAE operation provides the company with a permanent presence in a region with a strong concentration of refining, petrochemical, gas processing, fertiliser and chemical industries.

This combination of regional presence and technical expertise allows MERYT to work directly with process requirements and operating conditions when evaluating catalyst, adsorbent and advanced material applications.

Looking ahead, MERYT Chemicals is exploring opportunities to establish advanced materials processing and manufacturing capabilities in the UAE.

This initiative would strengthen the company's industrial presence in the region, enhance supply chain responsiveness, and bring catalyst and adsorbent technologies closer to customers across the GCC.



Catalysts and adsorbents are essential to reaction, separation and purification across the process industries

> ***MERYT Chemicals is exploring opportunities to establish advanced materials processing and manufacturing capabilities in the UAE***

CORE ACTIVITIES IN REFINING & PETROCHEMICALS

Catalysis remains at the heart of modern chemical production, with more than 90 per cent of chemical processes relying on catalysts at some stage.

Across refining, petrochemical and chemical operations, catalysts make it possible to achieve the required reaction rates, conversion and selectivity under technically and economically viable operating conditions.

Their performance has a direct impact on process efficiency, product quality, by-product formation and operating cycle length.

Adsorbents play an equally critical role in separation and purification by removing contaminants that can affect product quality, cause corrosion, damage equipment or poison downstream catalysts.

Depending on the process, sulphur compounds, mercury, chlorides, water and other trace components may need to be reduced to very low levels to protect subsequent process stages and meet required specifications.

Selecting the appropriate catalyst or adsorbent requires a detailed understanding of the process.

Feed composition, contaminant concentration and speciation, temperature, pressure, flow rate, reactor or vessel configuration, pressure drop, required performance and expected operating cycle all need to be considered when defining the most suitable material.

For industrial plants, material selection involves much more than meeting a standard product specification.

Performance under actual operating conditions, expected cycle length, mechanical stability, consistency, technical documentation and reliable supply all form part of the evaluation.

MERYT's approach is based on understanding the application first and defining material requirements from process conditions and expected customer performance.

FROM MOFS POWDER TO INDUSTRIAL MATERIAL

Alongside its established catalyst and adsorbent activities, MERYT is increasing its work on Metal-organic frameworks (MOFs), which are porous crystalline materials whose chemistry and pore structure can be tailored for specific adsorption, separation and catalytic applications.

Potential uses include CO2 capture, gas separation and purification, VOC removal, catalysis and atmospheric water harvesting.

For MERYT, the main challenge is industrialisation. A material showing excellent adsorption performance as a laboratory powder must still be manufactured reproducibly at a larger scale and converted into a form that can be used in industrial equipment.

Shaping the material into pellets or granules without significantly reducing its adsorption properties is an important part of this process.

Mechanical strength, attrition resistance, stability, bulk density, adsorption kinetics, regeneration conditions and manufacturing cost must also be considered.

MERYT is working on these aspects through MOF synthesis, scale-up, shaping and characterisation, with the objective of producing materials in practical forms and quantities for industrial evaluation and commercial applications.

EMERGING TECHNOLOGIES & APPLICATIONS

One area under development is CO2 capture and utilisation.

MERYT coordinates MOFs4SAF, an industrial research project with a total budget exceeding EUR6 million ($6.7 million) that combines advanced materials for CO2 capture with catalytic routes for its subsequent conversion into sustainable aviation fuels (SAF).

The project brings together industrial companies and research organisations working on material production, adsorption and catalytic conversion, with particular attention to moving technologies towards industrially relevant conditions.

Atmospheric water harvesting is another application of particular interest for advanced porous materials.

Certain MOFs can adsorb water vapour from air at low relative humidity and release it during regeneration, making them potentially relevant to water production in arid regions, including the Middle East.

Material performance alone is not sufficient; water uptake at required humidity, adsorption and desorption rates, regeneration temperature, hydrothermal stability and performance over repeated cycles determine whether a material can move from laboratory testing towards practical use.

Refineries, petrochemical complexes, methanol and ammonia plants, gas processing facilities and chemical producers continue to require catalysts and adsorbents for reaction, separation and purification.

At the same time, CO2 capture, water harvesting and other emerging applications are creating demand for materials with different adsorption and regeneration characteristics, positioning MERYT Chemicals to supply operating process plants while developing and scaling advanced materials for new industrial applications.

At ADIPEC 2026, MERYT Chemicals will meet operators, process engineers, EPC contractors and technology companies to discuss catalysts, adsorbents and advanced material applications across the process industries. ■

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Byrne leverages operational agility to accelerate oil and gas deployment

The company's rapid responsiveness and flexible fleet solutions empower international energy operators to establish remote operating sites efficiently across the expanding UAE market, Haroon Sarfraz tells *OGN*

BYRNE'S enhanced camp solutions, expanded rental fleet and integration of sustainable technologies are strengthening its ability to support the evolving UAE market and ADNOC's expansion plans.

A ready-to-deploy fleet, rapid mobilisation, a new service and maintenance depot near key oil and gas operating areas in Madinat Zayed, a broad product portfolio and strong compliance with ADNOC requirements positions Byrne as a leading equipment rental partner for industrial, construction and oil and gas projects.

ADNOC's $150-billion investment plan through 2030 is expected to drive larger and complex projects, while placing greater emphasis on operational efficiency, rapid execution and sustainability.

Byrne Equipment Rental is responding by expanding its fleet, investing in new capabilities and developing more integrated solutions to meet these evolving market requirements.

In an interview with ***OGN*** energy magazine, Haroon Sarfraz, General Manager – Byrne Equipment Rental, says: "Customers are looking for more than equipment. They need reliable partners with local knowledge, technical capability and the ability to deliver complete solutions quickly, safely and efficiently.

"Our ambition is to provide customers with their equipment rental, temporary infrastructure and related service requirements through one platform, making their operations simpler, more efficient and easier to manage."

Below are excerpts from the interview:



A solar lighting tower showcased at the Byrne headquarters



Haroon Sarfraz

How is Byrne supporting new oil and gas multinational players entering the UAE market?

New entrants often need to establish operations quickly in remote locations while navigating local regulatory, operational and logistical requirements.

Byrne combines ready fleet availability, local market knowledge, regulatory expertise and established operating capabilities to help customers establish and scale their operations efficiently.

Recently, a multinational oil and gas company secured a new concession in the UAE.

Byrne supported the customer establish its initial site office in a remote desert location through to ongoing wellsite requirements and fully managed staff accommodation.

The entire requirement was delivered under a single master call-off agreement with agreed rates, providing the customer with one commercial and operational interface and reducing the complexity of managing multiple suppliers.

What investments is Byrne making to support the growing oil and gas market?

We are making significant investments in fleet, infrastructure and technology to build capacity ahead of market demand.

Over the last two years, our UAE fleet has expanded by more than 35 per cent, and our objective is to increase it by approximately 70 per cent over the coming two years.

At the same time, we are introducing new product categories and integrated sustainable solutions.

The objective is to ensure that we have sufficient capacity across multiple product categories to support both routine field requirements and large-scale projects, including shutdowns and turnarounds where equipment availability is critical.

How important are safety and compliance in Byrne's offering?

These are fundamental to our business.

Our equipment and solutions are developed to meet ADNOC and applicable oil and gas industry requirements, with configurations adapted to the specific operating environment.

Where required, we incorporate ATEX-compliant fittings and DNV-certified lifting points for hazardous and remote applications.

However, compliance goes beyond certification; it has to be embedded throughout the entire rental cycle, from equipment selection and preparation through mobilisation, operation, maintenance and demobilisation.

What was the rationale behind establishing a new service and maintenance depot in Madinat Zayed.

Our new Madinat Zayed service and maintenance depot brings technical and maintenance capabilities closer to key oil and gas operating areas in Abu Dhabi.

The facility is designed to support customers with faster access to maintenance, servicing and technical support.

What is Byrne's capacity to support accommodation and temporary camp requirements?

Our capability has evolved from supplying individual accommodation units to delivering complete, fully managed temporary camps.

It includes accommodation modules, catering, cleaning, laundry, fuel, water and other life-support services, allowing customers to focus on their core operations while we manage the supporting camp infrastructure and services.

Byrne has the capability to setting up a fully serviced 300-person camp online in as little as 21 days, and a 60-person mini-camp in as little as 9 days.

How is Byrne integrating sustainability into its rental offering?

Sustainability is an integrated part of the power solution.

By expanding the use of solar power, solar lighting and battery energy storage systems (BESS) and combining these technologies with conventional generation, our aim to reduce fuel consumption and emissions while maintaining the reliability, flexibility and cost-effectiveness required for oil and gas operations.

Hybrid configurations combining solar, BESS and conventional generation can reduce generator running hours and fuel consumption while retaining conventional generation as a dependable power source when required.

What is the broader vision for Byrne in the market?

The market is becoming more sophisticated, and customers increasingly value suppliers that can combine scale, technical capability, speed of execution and operational accountability.

We are, therefore, investing across the business – in our people, fleet, infrastructure, technology and service capabilities – to ensure we can grow alongside our customers.

Our ambition is to position Byrne as a long-term equipment rental and temporary infrastructure partner for the customers. ■

Byrne Equipment Rental is exhibiting at Stand 11630, Hall 11.

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Measuring H2 in tail gas treatment units under changing operational conditions

Continuous hydrogen monitoring with the AMETEK 993X optimises tail gas treating unit efficiency, reduces downtime, and ensures regulatory compliance despite variable background gas compositions

SULPHUR recovery units (SRUs) are critically important to many natural gas processing facilities, oil refineries, chemical plants and even steel mills.

Although typically not a significant commercial output of these plants, elemental sulphur is recovered in the process of reducing harmful plant emissions.

Hydrogen sulphide (H_2S) and sulphur dioxide (SO_2) are both known pollutants that can be toxic to life at elevated levels.

As such, they are globally regulated, requiring their removal from process emissions.

The critical component of most SRUs – a modified Claus plant – has been consistently redesigned and modified to improve sulphur recovery efficiency to levels of 99 per cent or better.

However, many existing Claus plants were designed for, and are operating at, recovery efficiencies at lower levels.

For existing SRU operators that have recovery efficiencies that do not meet local regulation requirements, building a new, high recovery efficiency Claus unit can be financially and operationally difficult.

Instead, a tail gas treatment unit (TGTU) can, or in hundreds of cases, has been added to an SRU.

A TGTU is installed immediately after a Claus plant and converts any exiting sulphur (Sx) or sulphur components – SO_2, carbonyl sulphide (COS), carbon disulphide (CS), etc – present in the tail gas leaving a Claus plant to H_2S.

This H_2S is then captured and returned to the front end of the Claus unit, where it is again processed for elemental sulphur recovery.

The result is extremely low, and well within regulation levels of H_2S and SO_2 being released to the environment.

As we have presented in a previous article a key facilitator in the reduction of SO_2 in the TGTU is through the use of H_2 injection in the reduction gas generator (RGG).

Hydrogen is an important reaction element within the TGTU.

Under temperatures of 240-320 deg C, hydrogenation reactions occur across multiple sulphur-bearing species, converting them into H_2S; see equation 1 for example:

$$SO_2+3H_2 \rightarrow H_2S+2H_2O$$

(Equation 1)

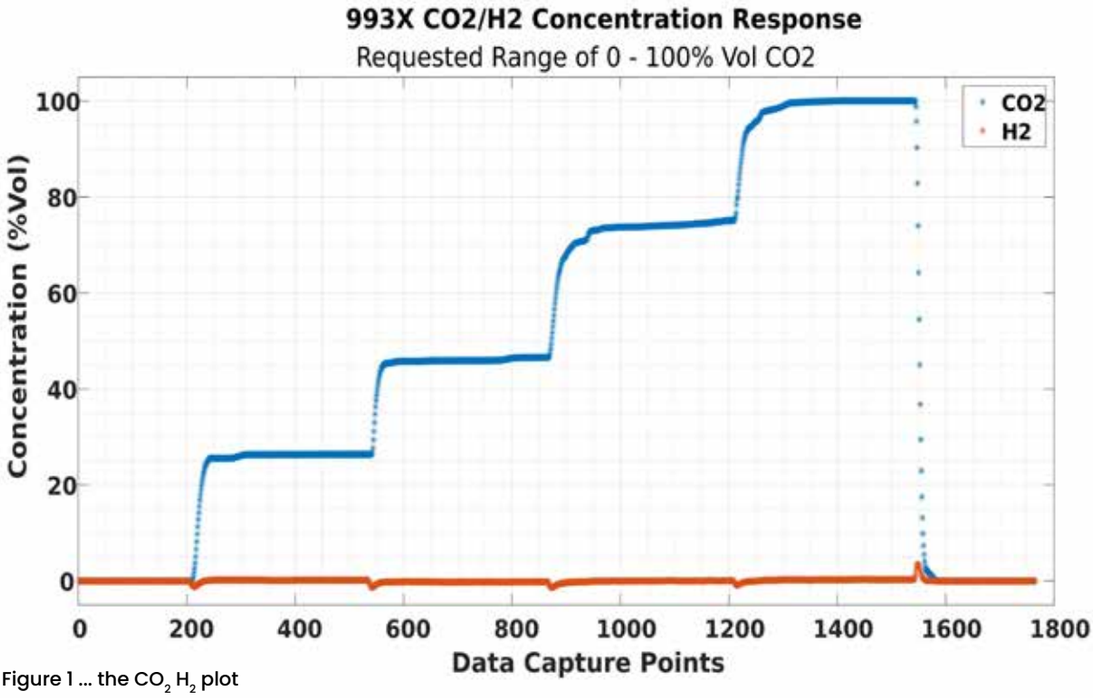


Figure 1 ... the CO_2 H_2 plot

It should be noted that H_2 is typically present in the Claus tail gas, but it is critical that an excess amount is maintained in order to ensure reduction of other sulphur compounds.

Therefore, SRU plant operations use concentration measurements from process gas analysers to measure H_2 levels.

If H_2 levels are not consistently above a pre-defined level, additional H_2 can be introduced into the TGTU for the required sulphur reduction.

A proven sensor for measuring H_2 concentration in a TGTU, is a thermal conductivity detector (TCD).

Hydrogen has a significant ability to conduct heat, as compared to other gases that would typically be expected to be present in a TGTU gas stream.

This unique characteristic enables a TCD to continuously detect even slight changes in H_2 concentrations in a sampled TGTU gas stream, when other technologies may take a significant amount of time to provide results.

In an effort to further increase SRU throughput and efficiency, some process changes have been implemented in the Claus plant, that are resulting in higher and often varying levels of carbon dioxide (CO_2) being present in the TGTU process gas.

In measuring H_2 with a TCD, this can be an issue, as CO_2 is known to cross-interfere with TCD-based hydrogen readings.

AMETEK has provided trusted TCD based analysers for hundreds of TGTU measurement points globally.

However, a modified solution is required by end users that are experiencing changing CO_2 concentrations in their operations.

To address this need, AMETEK has released the 993X Gas Analyser that incorporates multiple gas sensor technologies to provide an active CO_2 compensation measurement and correction.

Using an infrared (IR) detector to measure the concentration of CO_2, cross interference on the H_2 measurement output can be corrected.

Even with increasing and changing levels of CO_2, the impact on reported H_2 concentrations is minimal.

During factory validation, CO_2 is introduced at multiple levels to assess the impact on the H_2 sensor.

The concentration level of CO_2 flowing through the analyser ranges from a minimum of 0 per cent to a maximum of 100 per cent, with steps changes occurring at 25 per cent, 50 per cent, and 75 per cent.

Utilising this information, a software adjustment can be made to the H_2 output value providing a dynamic correction.

In the *Figure 1*, the H_2 output remains stable, even as CO_2 is introduced to the analysers at significantly elevated and changing levels.

The operational benefit is an accurate and real-time H_2 measurement even during process changes or upsets.

If necessary, action can be taken to immediately increase H_2 levels in the TGTU. This will protect the downstream scrubbing media and reduce the likelihood of a significant emissions event.

With ever increasing emissions regulations and focus on reductions in SRU down time and operating costs, the management of H_2 levels in a TGTU is critically important.

So real time measurement of H_2 is not a 'nice to have' but a requirement.

Knowing the current concentration of H_2 enables decisions and adjustments to be made that ensure optimal TGTU operation.

But one also needs to be aware that changing concentrations of other components present in the tail gas stream, notably, CO_2, can impact the measurement of H_2.

Therefore, the use of a fit for purpose analytical instrument like the AMETEK 993X should be a high priority. ■

AMETEK Process Instruments is exhibiting at Stand 12525, Hall 12.

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Linde Engineering pivots LNG technology portfolio to capture global demand

Surging global gas demand and hyperscale data centre power needs drive integrated LNG technology innovations, electrified plant designs, and carbon management solutions, John van der Velden tells *OGN*

BY ABDULAZIZ KHATTAK

LINDE Engineering is driving GCC national oil companies' (NOCs) ambitious global expansion by supporting increasingly complex offshore gas developments across the region.

To help regional energy giants solidify their leadership, the company delivers integrated gas processing technologies, modularised designs, and proprietary cryogenic equipment engineered to maximize overall efficiency and long-term operating reliability.

At the same time, unprecedented power demand from artificial intelligence (AI) and hyperscale data centres is steering GCC operators toward unified gas, power, and carbon management strategies.

In an exclusive interview with ***OGN*** energy magazine, John van der Velden, Senior Vice-President Large Projects, Linde Engineering says: "As global energy demand continues to grow, LNG will remain an essential enabler of energy security, affordability and emissions reduction. By combining end-to-end LNG technologies, proprietary cryogenic equipment and proven project execution capabilities, Linde Engineering helps customers develop competitive, reliable and sustainable LNG infrastructure that strengthens global energy resilience."

Below are excerpts from the interview:

Global LNG demand continues to accelerate, driven by European energy security concerns and Asian fuel switching. How is Linde Engineering adapting its LNG technology portfolio to capture these opportunities?

At Linde Engineering, our objective is to help customers bring competitive LNG capacity to market through a combination of integrated technology, proprietary equipment and strong project execution capabilities.

What differentiates Linde is our ability to support the entire LNG value chain, from feed gas pre-treatment and NGL recovery to the liquefaction but also nitrogen rejection, helium recovery and liquefaction as well as downstream infrastructure, with solutions tailored to the specific needs of each project.

Our natural gas liquefaction portfolio was developed around key principles, such as efficiency and customisation with certainty.

Our various technologies, ranging from nitrogen expansion to the mixed refrigerant process, provide optimised solutions across different scales and applications, while our modularised approach making use of standardisation helps reduce capital intensity and accelerate schedules.



A mid-scale StarLNG® 0.8 mpta liquefaction capacity plant in Bintulu, Malaysia



John van der Velden

Equally important is our ability to combine technology leadership with execution excellence.

With AI and hyperscale data centres creating unprecedented power demand, are you seeing increased interest in LNG-based power generation integrated with carbon management solutions?

The rapid growth of AI, cloud computing and hyperscale data centres is creating an entirely new category of energy demand.

Operators require reliable, around-the-clock power, and in many locations existing grid infrastructure simply cannot expand quickly enough to keep pace.

This has led to renewed interest in natural gas and LNG-based power generation because they can provide the dispatchable and secure energy supply required to support these developments.

What is particularly interesting is the growing focus on integrated energy solutions.

Customers are no longer evaluating fuel supply, power generation and carbon management separately; they are looking for solutions that combine reliable gas and LNG supply with efficient power generation, CO_2 removal and carbon capture.

Linde Engineering is well positioned to support these developments through our expertise in gas processing, carbon management and process integration.

How is Linde's proprietary heat-exchanger technology helping GCC national oil companies that are expanding globally and developing increasingly complex offshore gas projects?

Cryogenic heat exchangers are at the heart of every LNG facility and have a direct impact on efficiency, reliability and long-term performance.

This is an area where Linde has built significant expertise over many decades.

One of our key strengths is that we not only develop the technology but also manufacture many of the critical cryogenic components in-house.

This includes coil-wound heat exchangers (CWHEs), plate-fin heat exchangers (PFHEs), cold boxes and cryogenic pumps.

Our coil-wound heat exchangers have an exceptional track record, with more than 1,000 units supplied worldwide.

For major GCC gas developments, access to integrated technology and proprietary equipment is increasingly becoming a competitive advantage, helping operators maximise efficiency while maintaining world-class reliability.

How are Linde's LNG designs helping operators reduce energy consumption especially at a time when sustainability is a key differentiator?

In LNG, there are three principal levers to reduce emissions.

Firstly, and most importantly, is energy efficiency.

Improving energy efficiency is not only an environmental objective, it is also one of the most effective ways to reduce operating costs and enhance project economics.

Secondly, operators are increasingly pursuing electrification strategies to further reduce emissions.

Not only are we in the position to electrify our client's plants but we also provide technologies, such as nitrogen rejection, to monetise in the surplus molecules.

Thirdly, carbon capture and storage can play an important role where further emissions reductions are required.

In this area, Linde has been a pioneer for many years.

One of our references in Norway was among the earliest LNG developments to incorporate full sequestration of the CO_2 removed from the feed gas, demonstrating that LNG production and carbon management can be successfully integrated at industrial scale.

What innovations is Linde deploying in LNG regasification, boil-off gas management and emerging offshore applications to reduce emissions?

The industry is increasingly focused on maximising resource efficiency and minimising emissions across the entire LNG value chain.

This extends beyond carbon dioxide to include methane management, reduction of product losses and optimisation of energy recovery.

A key differentiator is our ability to combine proprietary technologies with Linde-manufactured cryogenic equipment, ensuring seamless integration between process design and plant operation.

In LNG receiving terminals, for example, our SUB-X® submerged combustion vaporiser technology delivers exceptional thermal efficiency while maintaining the operational flexibility required for modern energy systems.

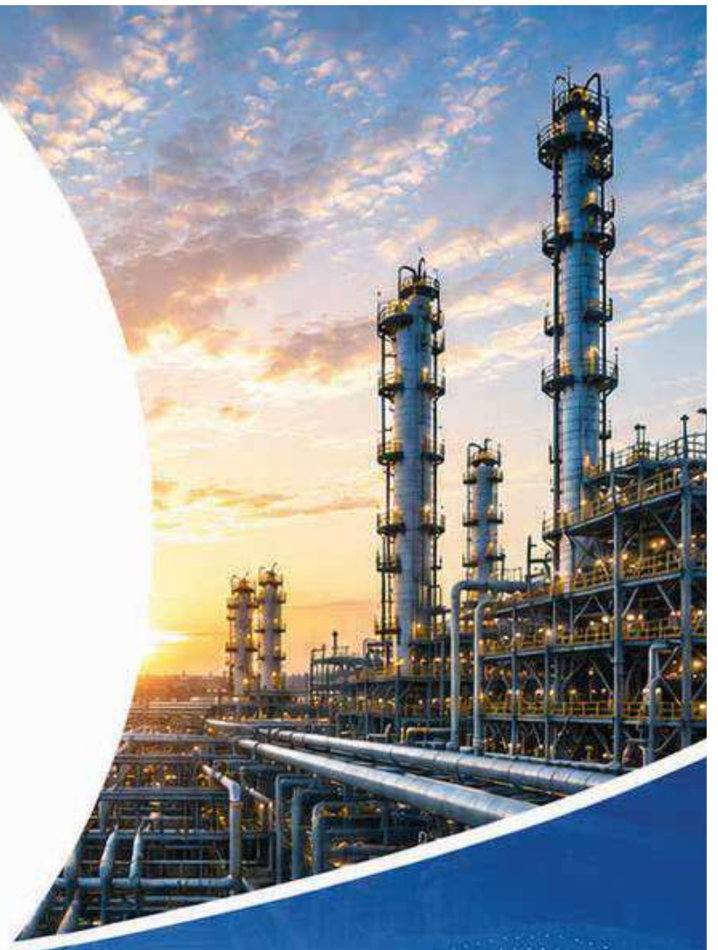
As we look toward the next generation of LNG projects, including floating and offshore developments, customers increasingly seek partners that can provide technology, critical equipment and execution capability under one roof.

This integrated approach reduces project risk and helps operators achieve their objectives for reliability, sustainability and long-term value creation.

Ultimately, the projects that will define the next decade will be those that successfully balance energy security, economic competitiveness and environmental responsibility. At Linde Engineering, we see our role as enabling customers to achieve that balance while contributing to greater global energy resilience. ■

Linde is exhibiting at Stand 5240, Hall 5.

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System of Systems architecture reshapes regional industrial energy landscape

Industrial autonomy across complex multi-company energy clusters requires macro-level orchestration and secure federated data architecture to unlock emergent operational value, Dr Darius Ngo tells *OGN*

BY ABDULAZIZ KHATTAK

INDUSTRIAL energy landscapes are undergoing a profound transformation as autonomous System of Systems (SoS) architectures replace isolated control platforms to orchestrate multi-company hubs.

By acting as a macro-orchestrator across regional industrial ecosystems, this advanced framework integrates independent systems to generate emergent operational value and cross-enterprise synergies that individual assets cannot achieve independently.

In an exclusive interview with ***OGN*** energy magazine, Dr Darius Ngo, Senior Vice-President and Fellow, Yokogawa, says: "Yokogawa's SoS acts as the macro-orchestrator that can integrate multiple, independent digital twins to synchronise operations across a broader economic or regional landscape, unlocking value that a localised digital twin cannot access alone."

Deploying agile overlay architectures enables operators to bypass legacy infrastructure constraints and reconcile real-time data integration across sprawling Middle Eastern clusters.

Below are excerpts from the interview:

How does a 'System of Systems' (SoS) architecture fundamentally differ from traditional enterprise control systems or standard digital twin platforms?

The SoS is a collection of independently operated and managed systems that are connected to form a larger, cohesive ecosystem to deliver synergies and "emergent value" that none of the individual systems could achieve on their own.

Traditional enterprise control systems focus on decentralising control by assigning controllers to specific pieces of equipment within a single facility to ensure fault isolation, process safety, and continuous operation.

Whereas a standard digital twin relies on first-principle mathematical models and real-time sensor data to simulate a specific physical asset or process at the operational level.

It is designed to answer specific predictive questions: "What if?", "What is next?", and "What is best?" for that particular asset.

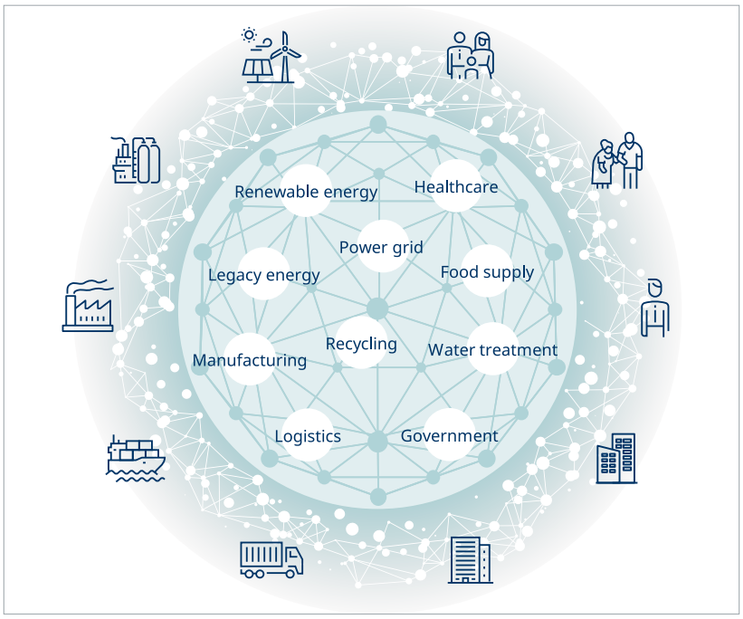
Yokogawa's SoS acts as the macro-orchestrator that can integrate multiple, independent digital twins to synchronise operations across a broader economic or regional landscape, unlocking value that a localised digital twin cannot access alone.

How do you reconcile cross-enterprise SoS integration across mega industrial hubs with the reality that many regional upstream and refining assets still operate on isolated legacy control infrastructure?w

Yokogawa does this by deploying agile overlay architectures, primarily through collaborative information server (CI Server), which extract and normalise operational data without requiring an immediate "rip-and-replace" of existing assets.

In sprawling industrial clusters like Jubail, Ruwais, or Sohar, achieving macro-level goals, such as region-wide decarbonisation and energy efficiency, requires data fluidity that legacy systems inherently resist.

Rather than waiting for complete infrastructural modernisation, Yokogawa bridges this gap to accelerate the transition toward industrial autonomy.



Yokogawa's SoS connects independently operated and managed systems to deliver synergies to all stakeholders in an ecosystem



Dr Darius Ngo

What specific commercial and data-governance models are needed to convince competitors in the region to share real-time operational data across an SoS platform?

Yokogawa and operators use decentralised frameworks where data is treated carefully. To integrate systems without risking intellectual property, industrial clusters use specific models:

- The "Trusted Partner" Model has a neutral provider manage data sharing, ensuring it's used for shared benefits while keeping competition safe.
- Federated Data Architecture keeps data local, allowing only necessary insights to be shared.
- Data Abstraction protects secrets by sharing only summaries, like "surplus steam capacity," rather than exact figures.
- Smart Contracts automate financial transactions tied to data sharing, creating a reliable commercial model.

Who carries legal and financial liability when an autonomous optimisation decision across an interconnected multi-company cluster triggers an unplanned plant shutdown?

In a cross-enterprise SoS, liability for an autonomous shutdown is shared among asset owners, platform orchestrators, and insurance systems, depending on where the system fails.

Industrial clusters manage risk from cyber threats using structured liability models.

Each plant retains control over its operations, even with federated data. If a harmful command from the core network reaches a local plant and is not stopped by its safety systems, the asset owner may face significant liability for not maintaining strong operational boundaries.

If an autonomous shutdown results from software defects or negligence, technology providers can be financially responsible under service level agreements or product liability laws.

To avoid lengthy litigations, liability definitions are embedded in blockchain-based smart contracts, providing automatic financial penalties when a company's negligence leads to shutdowns, ensuring quick resolutions and financial stability.

How does SoS balance intermittent renewable power against continuous synthesis across regional hydrogen corridors with multiple asset owners?

Yokogawa's SoS architecture resolves the inherent conflict between intermittent renewable generation (solar/wind) and the strict, continuous demand of chemical synthesis (hydrogen production or CCUS compression) by acting as an algorithmic arbitrator and macro-orchestrator.

When operating across regional corridors involving multiple asset owners, the architecture relies on advanced dynamic optimisation, intelligent buffering, and rule-based commercial logic to keep the ecosystem balanced.

What has been the biggest roadblock during the execution of cluster-wide digital integration projects in Middle Eastern energy hubs, and how was it overcome?

The main challenge in achieving digital integration in energy hubs is overcoming the strict "air-gap" mentality while ensuring cybersecurity.

For years, operators kept their high-risk operational technology (OT) isolated from external networks to protect against cyber threats.

However, integrating these systems into a unified structure requires sharing OT data with information technology (IT) layers.

To address this, Yokogawa and regional organisations implemented zero-trust edge architectures and hardware-enforced data diodes, allowing unidirectional data flow from legacy plants to a regional digital model without enabling reverse communication.

This method ensures safety and control by pushing optimisation targets to secure gateways, allowing real-time data use while maintaining control network security. ■

Yokogawa is exhibiting at Stand 12710, Hall 12.

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STATS keeps pipeline product moving during major 48-inch valve replacement

STATS Group completed a double BISEP® isolation and bypass operation on a critical Canadian liquids pipeline, allowing a redundant valve to be removed without interrupting throughput

A MAJOR Canadian pipeline operator completed a complex 48-inch valve replacement while keeping product flowing, using a double isolation and temporary bypass solution delivered by STATS Group.

The project was carried out on a high-throughput liquids pipeline that forms part of one of North America's largest pipeline systems.

Originally constructed in the early 1970s, the line is a critical supply asset where a prolonged shutdown would have created significant operational complexity, cost and potential disruption for customers.

The work involved removing a 48-inch valve that no longer served its original purpose and installing a pretested replacement pipe section.

To create a safe worksite without stopping the line, STATS deployed two BISEP® line stopping tools and an integrated temporary bypass.

The scope represented the first 48-inch double BISEP isolation with bypass of its type on the operator's Canadian assets.

It followed a successful single BISEP isolation and bypass completed on the same system in 2024 to support an earlier valve repair.

Kurt Anderson, Senior Business Development Manager at STATS Group, tells ***OGN*** energy magazine: "Our aim was to give the operator a safe, reliable and predictable way to complete essential maintenance while protecting throughput and avoiding an extended outage."



On the day of the intervention, the two BISEP tools were lowered simultaneously while the pipeline remained operational

CAREFUL PLANNING REDUCES EXECUTION RISK

STATS and the operator developed the execution plan collaboratively over several months.

STATS supplied the split tees, double block and bleed slab valves, hot tapping equipment, BISEP tools and field technicians, while the operator installed the split tees and prepared the replacement pipework.

The work was staged to minimise activity during the final tie-in window.

In the preceding week, the slab valves were installed and the 48-inch hot taps completed using a SureTap® ST1530 machine.

The line stop tools and temporary bypass were then assembled and pressure tested at operating pressure.

The complete bypass system was flooded from the operating line before the main intervention, confirming readiness and reducing the number of critical activities required on execution day.

48-HOUR EXECUTION WINDOW ACHIEVED

On the day of the intervention, the two BISEP tools were lowered simultaneously while the pipeline remained operational.

The flow was diverted into the bypass, the seals were hydraulically set and independently tested, and STATS issued the isolation certificate once leak-tight isolation integrity had been confirmed.

The operator's maintenance team then drained the short-isolated section, removed the redundant valve and installed the new pipe spool.

After welding and non-destructive examination, the replacement section was flooded and pressure equalised.

STATS retracted the tools and returned flow to the normal pipeline route.

Completion plugs were installed in the split tee flanges, allowing the temporary slab valves to be removed and the fittings secured with blind flanges.

The entire sequence, from isolation to restoration of normal operations, was completed within the planned 48-hour window.

Maintaining throughput throughout the work also avoided a potential 96-hour outage associated with traditional isolation methods.

For an asset of this scale, the result demonstrated that a major intervention could be completed safely and predictably without sacrificing delivery commitments.



A dual 48-inch BISEP isolation and bypass in Canada

SAFETY, COST & ENVIRONMENTAL GAINS

By using a monitored leak-tight dual-seal barrier as the primary isolation, the project reduced reliance on additional vapour-management measures and simplified the construction and reinstatement sequence.

Positioning the split tees closer together reduced excavation and backfill requirements by approximately one-third compared with alternative approaches.

Avoiding traditional mud plugs and the need to track and receive vapour tool pigs also removed associated cost, schedule pressure and operational risk.

Hot tapping and line stopping also avoided depressurising a long section of pipeline or displacing large product volumes.

For liquids assets, that means less product handling, lower waste generation and a smaller worksite footprint, supporting both environmental performance and responsible asset stewardship.

For owners managing ageing assets, rising throughput demands and tighter safety and environmental expectations, the project demonstrates a practical alternative to prolonged shutdowns.

Anderson adds: "Large-diameter interventions demand extensive preparation long before tools are deployed. Early engagement enabled the teams to align engineering, equipment supply, hot tap execution, bypass configuration, pressure testing, and reinstatement before work began."

He adds: "The result shows how a carefully engineered double BISEP isolation and bypass can support major maintenance on critical infrastructure while keeping product moving. The intervention was delivered within the planned window and the pipeline was returned safely to normal operation." ■

STATS UK is is exhibiting at Stand 7234, Hall 7.

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DOVER PRECISION COMPONENTS

WSA technology turns Middle East waste sulphur into commercial assets

Innovative wet gas sulphuric acid processes transform troublesome off-gas into high-value chemical commodities, slashing energy consumption and maximising regional industrial efficiency

SULPHUR management has long been treated as a cost of doing business; a regulatory box to tick rather than a source of value.

However, this thinking is starting to shift in the Middle East, where refineries and gas processing plants operate at some of the largest scales in the world.

Wet gas sulphuric acid (WSA™) technology offers operators a way to turn sulphurous off-gas into a marketable product while cutting energy costs at the same time.

"This is a proposition with obvious appeal in a region defined by both hydrocarbon scale and industrial diversification ambitions," Marie Vognsen, Topsoe, tells ***OGN*** energy magazine.

The Middle East is home to some of the world's largest gas processing complexes, many of them handling sour gas with significant hydrogen sulphide (H_2S) content.

Historically, this has been done through the Claus process, which converts H_2S into elemental sulphur.

With tail gas treatment, it can achieve high recovery rates, but it comes with real operational baggage.

Claus units also struggle with lean or fluctuating sulphur streams, and with sour water stripper (SWS) gases in particular, where ammonia content can form salts that poison catalyst and foul equipment.



Topsoe's WSA plant

THE WSA ALTERNATIVE

WSA takes an entirely different approach, and removes additional processes/ plants in generating sulphuric acid from elemental sulphur.

Rather than converting H_2S into elemental sulphur, it converts H_2S directly to commercial-grade sulphuric acid (H_2SO_4) – the most widely used industrial chemicals in the world after crude oil.

The process uses only air, cooling water and boiler feed water, with no chemical additives and no waste streams.

Topsoe's process runs in three stages: H_2S in the feed gas is first combusted to form SO_2 and water; the SO_2 is then oxidised to SO_3 across a multi-bed converter using Topsoe's proprietary VK-W catalyst.

Finally, the SO_3 is hydrated by the water vapour already present in the process gas, forming sulphuric acid, which condenses in Topsoe's purpose-built WSA condenser, recovering heat as it does so (*Figure 1*).

The result is commercial-grade acid and a clean gas stream, with SO_2 emissions that can be engineered down to below 10 ppmv.

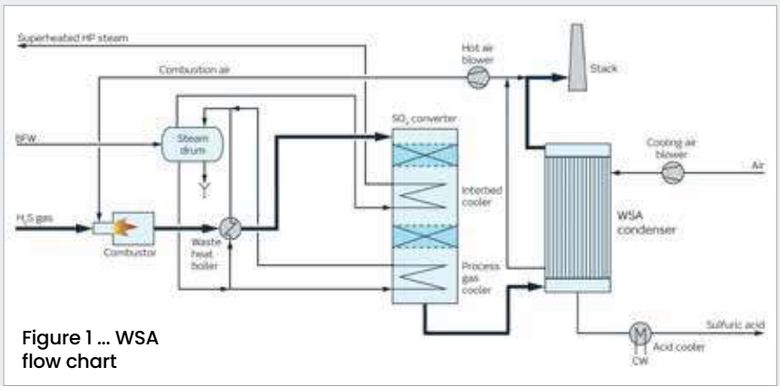


Figure 1 ... WSA flow chart

THE EFFICIENCY CASE

More than 90 per cent of the thermal energy released by the process chemical reactions is recovered as high-pressure superheated steam, which can be integrated directly into plant operations to offset steam otherwise generated by fossil-fuel-fired boilers.

That is a direct operating cost reduction, independent of any emissions target.

Operationally, WSA units are compact, running close to atmospheric pressure, which simplifies both safety cases and maintenance planning.

Because the process operates at lower pressure than Claus, acid gas from the amine regenerator and sour gas from the sour water stripper can be supplied at reduced pressures – easing reboiler duties on the units feeding it.

And because WSA runs in full combustion mode, it avoids two persistent Claus headaches: Ammonia slip from the combustion chamber and soot-related catalyst bed choking.

FROM COST TO COMMERCIAL ASSET

The sulphuric acid produced is a saleable commodity, with established markets in fertiliser production, metallurgical leaching, water treatment and chemical manufacturing.

For operators in the Middle East and beyond, that creates a genuine second revenue line.

IndianOil's Haldia refinery, for example, has used a WSA plant to convert acid off-gas into a product now feeding fertiliser and special chemicals production, while delivering the largest carbon savings recorded across the IndianOil group's project portfolio.

PetroPeru's Talara refinery has taken a similar approach, feeding WSA-derived acid into the copper mining and fertiliser sectors and reducing Peru's reliance on imported chemicals, while the steam generated offsets natural gas otherwise burned on site.

Both configurations targeting 99.9 per cent sulphur recovery found WSA offset six times more than the Claus direct CO2 emissions and delivered higher-value steam output.

The economics increasingly favour the acid route too: At April 2026 Brazil CFR pricing, sulphuric acid traded at roughly $1,100 per tonne of sulphur-equivalent against around $870 per tonne for elemental sulphur.

A PRACTICAL PATH TO ADOPTION

Ageing Claus units can be phased out and replaced incrementally, letting operators build acid-handling experience and offtake relationships before committing further capacity.

Topsoe supports the transition end-to-end, from licensing and basic engineering through proprietary catalyst supply and commissioning, with its ClearView™ digital platform providing real-time monitoring and optimisation once the plant is running.

With more than 175 WSA units operating worldwide, handling process gas flows from 9,000 to over 1,000,000 Nm³/h across refining, gas processing and other industrial applications, the technology is de-risked and established.

For Middle East operators looking at both refineries and gas plants through an efficiency and value-creation lens, WSA offers a proven route to lower operating costs, a saleable product and a more resilient sulphur management strategy, regardless of where regulation moves next. ■

Topsoe is exhibiting at Stand 16190, Hall 16.

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From hypothesis to high value: How AI is rewriting the rules of chemical discovery

The implications of the convergence of AI, scientific data, and advanced computing reach well beyond the laboratory, writes Salam Awawdeh, Senior MD – Energy & Chemicals, EMEA, Accenture

THERE is a productive tension at the heart of modern chemical innovation. The industry's most consequential commercial opportunities: cleaner processes, higher-performance specialty materials, next-generation catalysts, components for the energy transition, are also among the most scientifically demanding challenges it has faced.

They must be solved faster, more economically, and with less resource intensity than previous waves of innovation required.

The constraint is not intellectual ambition since research teams across the global chemical industry are pursuing important and legitimate scientific questions.

The constraint is combinatorial: The number of possible molecular configurations, formulation variables, process parameters, and material compositions that could theoretically be explored runs into billions.

Sequential laboratory-based discovery, however skilfully designed, can traverse only a narrow fraction of that space within any commercially relevant timeframe.

This is the underlying problem that artificial intelligence (AI) and advanced computing are beginning to address, not by replacing the scientific process, but by dramatically expanding its reach.



AI and advanced computing are dramatically expanding the reach of the scientific process

THE NEW ARCHITECTURE OF DISCOVERY

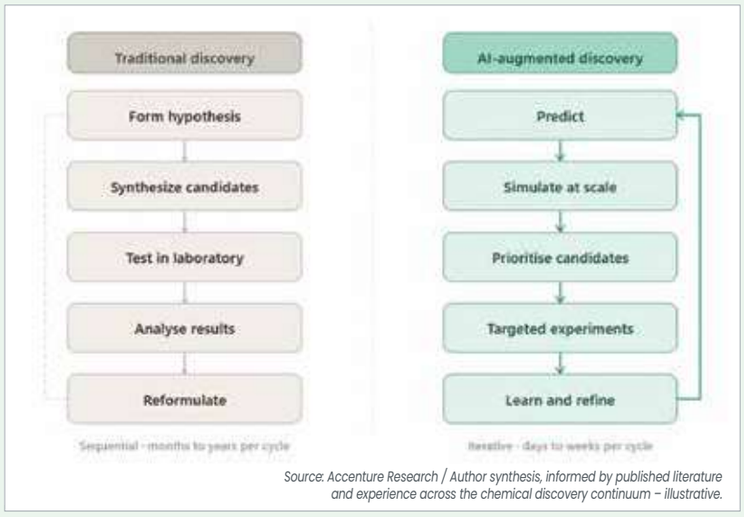
To understand what is changing, it helps to contrast two discovery models (*Figure 1*).

In the traditional model, a research team draws on accumulated knowledge to form a hypothesis, synthesises a set of candidate molecules or materials, tests them against target properties, and uses results to frame the next experiment.

This cycle is powerful and has generated many of the industry's most significant advances.

It is also inherently sequential, and its productivity depends heavily on the prior knowledge used to selecting where to experiment.

In the emerging model, AI systems trained on large repositories of experimental and computational data can propose candidate molecules, reaction pathways, and material compositions across a far broader design space than any research team could manually survey.



Source: Accenture Research / Author synthesis, informed by published literature and experience across the chemical discovery continuum – illustrative.

Figure 1 ... Discovery model comparison diagram

High-performance computing infrastructure evaluates many of these candidates through physics-based simulation before any synthesis takes place.

Automated laboratory platforms conduct targeted physical experiments at higher throughput and feed results back into the models, making each successive cycle more informed.

AI-powered modelling is enabling chemical design that is faster in iteration, smarter in candidate selection, and improved resource efficiency, thus reducing the number of physical experiments required to converge on a viable solution.

The result is not merely accelerated science; it is a fundamentally more systematic form of scientific exploration.

EVIDENCE ACROSS SECTORS

Three fields illustrate the trajectory:

- In materials science, Google DeepMind's graph neural networks identified more than 380,000 novel stable inorganic material candidates from a single computational screen, substantially exceeding the cumulative output of decades of traditional crystallographic research, as documented in the study published in Nature in 2023.
- In protein and enzyme engineering, the AI-enabled structure prediction advances, recognised by the 2024 Nobel Prize in Chemistry, are being applied to biocatalysis, opening new pathways to plastic degradation and the conversion of feedstocks into higher-value chemical products.
- In battery and energy materials, AI-guided screening has been demonstrated at institutional scale: A collaboration between Microsoft and Pacific Northwest National Laboratory evaluated more than 32 million candidate materials and identified a promising solid-state electrolyte candidate in under nine months, compressing a process that traditional methods would have taken years to complete.

For GCC producers expanding into energy storage and circular chemistry, these are not distant research trends, they represent adjacent competitive territory.

None of these examples constitutes a fully resolved commercial deployment, and rigorous experimental validation remains essential.

But they are credible signals of the trajectory and of the advantage available to organisations that move from awareness to capability (*Figure 2*).

STRATEGIC RELEVANCE FOR ARABIAN GULF & BEYOND

For chemical organisations in the Arabian Gulf, the strategic dimensions of AI-driven discovery are not theoretical.

They are embedded in decisions about where to invest, what to develop, and how to compete in the decade ahead.

Consider the position of the region's most integrated energy and chemi-

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AI-guided screening can support catalyst and process optimization across refining, petrochemical and downstream operations

»
cal enterprises.

Many of them have declared ambitions in specialty chemicals and performance materials, and the R&D challenge implicit in that transition is precisely where AI and computational discovery add leverage (*Figure 3*).

Accelerating catalyst development for new process configurations, screening formulation candidates for higher-margin specialty products, and compressing the timeline from scientific concept to commercial scale.

Other national energy companies and downstream players that are investing in digital infrastructure and AI capability across industrial operations face an analogous opportunity.

Connecting those broader investments to chemicals and materials R&D programmes where discovery speed, validation rigor and scale-up discipline increasingly determine competitive advantage.

Across refining, petrochemical and downstream operations, AI-guided screening can also support catalyst and process optimisation, domains where performance gains translate directly to efficiency, resilience and margin.

Across the Arabian Gulf, regional producers face a common strategic imperative: Building on the GCC's existing scale and competitiveness to further expand into differentiated, higher-value products and materials.

Achieving that transition will depend not simply on producing more efficiently, but on innovating more rapidly, making faster, more targeted discoveries an increasingly critical source of competitive advantage.

What distinguishes GCC producers in this context is not access to AI tools, which are increasingly available globally.

It is the combination of assets that sit behind any serious discovery programme: Industrial-scale process data generated by large operational footprints; deep domain expertise in hydrocarbon chemistry, catalysis, and petrochemicals; and growing R&D investment and scientific talent across the region.

Research on innovation effectiveness in process industries, including work by Accenture and others, consistently identifies data quality, research-to-deployment integration, and learning cycle speed as the differentiating factors between high- and low-performing R&D programmes.

GCC producers have the feedstock, the infrastructure, and increasingly, the scientific capability.

Among those enabling factors is whether AI-driven discovery is being built with the same institutional seriousness that has been applied to digital transformation in operations.

WHAT LEADERSHIP MUST NOW DECIDE

Realising this opportunity requires deliberate organisational choices that go beyond technology acquisition.

The organisations advancing most effectively in AI-driven chemical discovery tend to concentrate capability in a small number of high-value scientific domains such as catalyst optimisation, polymer formulation, process efficiency, and circular material design.

They treat scientific and experimental data as a strategic asset, investing in its quality and governance before asking AI systems to learn from it.

And they build genuine integration between computational and experimental research functions, so that digital prediction and physical validation form a coherent and iterative system rather than parallel workstreams.

WHAT CONVERGENCE MAKES POSSIBLE

The chemical industry has navigated major technological transitions before; from batch to continuous processing, from empirical formulation to molecular design, from manual analysis to computational chemistry.

Each redrew the economics of discovery and reshaped competitive positions. The convergence of AI, scientific data, and advanced computing belongs in that sequence.

It will not remove the need for scientific expertise, physical experimentation, or the hard-won knowledge that comes from operating chemistry on an industrial scale.

It will, instead, multiply what that expertise can achieve.

Organisations that engage with both ambition and rigour will find that AI and supercomputing do not change what chemistry is; they expand what chemistry can discover. ■

Salam Al Awawdeh, Senior Managing Director – Energy & Chemicals, EMEA, Accenture, moderated the strategic panel, "The Next Frontier of Innovation: Converging Discovery with AI and Supercomputing," at the 8th GPCA Research & Innovation Conference, held on September 16–17, 2026, at Le Meridien Al Khobar, Saudi Arabia. The session featuring Prof Raghavan B Sunoj, Professor of Chemistry, Indian Institute of Technology Bombay (IIT Bombay); Mohammad B Jalaly, Manager, Saudi Accelerated Innovation Lab (AramcoSAIL); and Saud Abdulaziz Alghwainem, Lead Scientist, Data Innovation, SABIC, explored how AI and supercomputing are reshaping innovation and accelerating discovery across the chemical industry.

This article was originally published by the Gulf Petrochemicals and Chemicals Association (GPCA), the voice of the chemical industry in the Arabian Gulf. To learn more visit: https://gpcachem.org/

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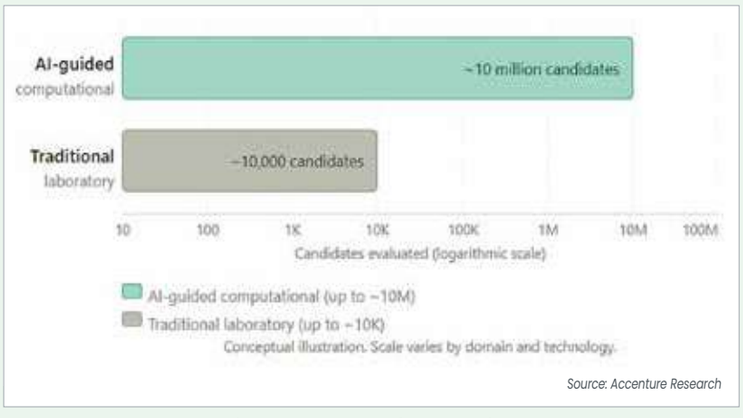


Figure 2 ... Scale of exploration

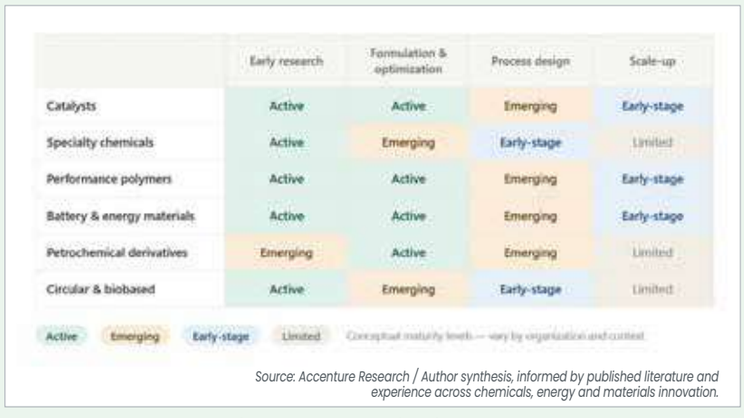


Figure 3 ... AI application map

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Mitsubishi Power drives Gulf energy transition with flexible gas turbines

Advanced turbine technology balances surging power demand from AI intelligence and regional industrial expansion with ambitious Middle Eastern decarbonisation targets and solar integration, Dr Javier Cavada tells *OGN*

BY ABDULAZIZ KHATTAK

RAPID economic diversification, industrial growth and the exponential rise of artificial intelligence (AI) are driving unprecedented electricity demand across the GCC region.

To balance this explosive expansion with ambitious decarbonisation targets, regional utilities are deploying advanced thermal generation solutions to guarantee grid stability alongside variable renewable energy.

Mitsubishi Power is addressing these complex power system requirements by delivering fast-ramping, highly efficient gas turbine technologies that enable seamless grid integration.

In an exclusive interview with ***OGN*** energy magazine, Dr Javier Cavada, President & CEO of Mitsubishi Power EMEA, says: "Ultimately, the UAE and the wider Gulf will need significantly more electricity to achieve their economic ambitions. The question is how that additional capacity can be built while continuing to decarbonise."

To de-risk infrastructure investments and accelerate project deployment, the company utilises rigorous pre-testing protocols alongside local manufacturing capabilities.

Below are excerpts from the interview:



A M701JAC gas turbine ... hydrogen-ready

How is Mitsubishi Power supporting utilities with fuel flexible, high efficiency, fast ramping gas turbine solutions that secure stable grid capacity while enabling countries to meet their decarbonisation targets?

In the UAE and across the GCC region, AI and data centres are becoming a major new source of electricity demand and the scale and speed of that growth is really unlike anything we've seen before.

Globally, the IEA expects data centre electricity consumption to roughly double by 2030, with AI the biggest driver of that increase.

But data centres are part of a much broader demand story in this region.

Countries across the GCC are pursuing ambitious economic diversification plans, developing new industries and electrifying more of their economies.

At the same time, they are rapidly expanding renewable energy generation and working to decarbonise their power systems.

So, the challenge is really doing both things at once: Meeting a very significant increase in electricity demand while continuing to reduce the carbon intensity of the power system.

That is where flexible, high-efficiency thermal generation becomes increasingly important.

Mitsubishi Power's JAC-series gas turbines combine availability of more than 99.5 per cent with combined-cycle efficiency exceeding 64 per cent.

Their fast-ramping and load-following capabilities enable utilities to provide the reliable power needed to serve large and rapidly changing loads from AI and data centres, while adjusting output as renewable generation rises and falls.

This flexibility helps utilities meet growing demand while integrating more renewable energy without compromising grid reliability.

Importantly, this generation can continue to decarbonise over time.



Dr Javier Cavada

Our advanced-class gas turbines are hydrogen-ready, with 50 per cent hydrogen co-firing already demonstrated and a technology roadmap toward higher blends and ultimately 100 per cent hydrogen firing by the end of this decade.

Ultimately, the UAE and the wider Gulf will need significantly more electricity to achieve their economic ambitions.

The question is how that additional capacity can be built while continuing to decarbonise.

Reliable, efficient and increasingly fuel-flexible generation therefore has an important role to play.

As solar capacity increases, how are your flexible, fast-start power generation technologies evolving to maintain grid frequency stability amidst increasing operational intermittency?

Solar is expanding extraordinarily quickly across the Middle East and North Africa.

The IEA expects solar PV capacity across the region to increase tenfold by 2035, adding around 200 GW, while renewables overall rise from 6 per cent of electricity generation in 2024 to 25 per cent by 2035.

In Saudi Arabia alone, the government is targeting 130 GW of renewable capacity by 2030, up from less than 5 GW at the time of the IEA's 2024 assessment.

The challenge increasingly becomes managing steeper ramps, greater variability and the need for other assets to respond quickly as solar output changes.

But the answer is not one technology alone.

Advanced gas turbines provide dispatchable capacity, fast ramping capability and the operational responsiveness required to balance changes in electricity supply and demand, helping grid operators maintain frequency stability and overall system reliability.

Battery energy storage systems will increasingly provide fast frequency response and short-duration balancing, while stronger transmission networks, digital grid management and flexible generation will address other system requirements.

Hydrogen-ready gas turbines can provide longer-duration dispatchable capacity while offering a future pathway toward lower-carbon generation as hydrogen infrastructure and fuel supplies develop.

We are moving towards a more integrated energy system in which solar, storage, transmission networks and flexible generation each perform the functions they are best suited to.

Following your participation in high-level strategic roundtable 'The infrastructure imperative: ››

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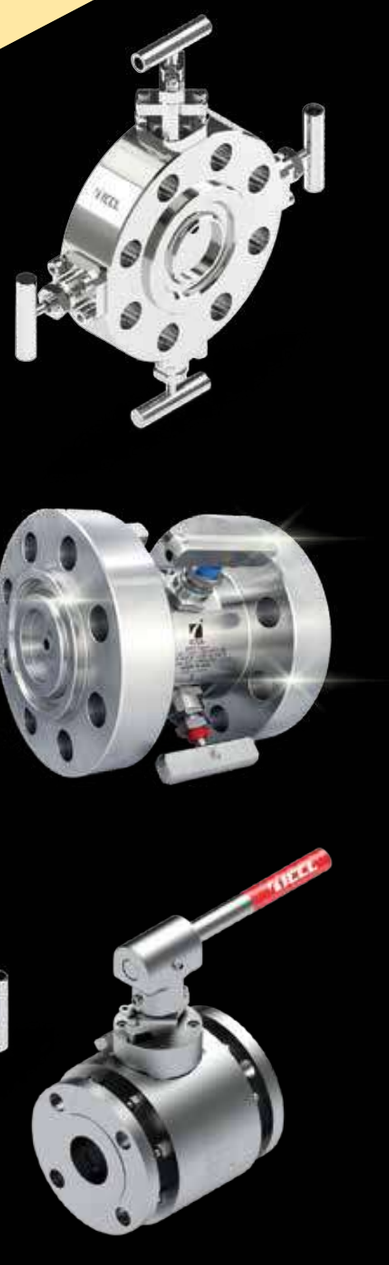
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JAC-series gas turbines' efficiency exceeds 64 per cent

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building the foundations of energy security,' you will discuss financing and execution risks.

How does Mitsubishi Power help regional partners de-risk these massive infrastructure investments, so they move faster from paper to actual operation?

For major energy infrastructure projects, de-risking technology is about much more than proving that the equipment works.

Investors, utilities and governments need confidence that it can be manufactured and delivered on schedule, integrated successfully into the project and perform reliably over decades of operation.

Early engagement allows equipment requirements, manufacturing schedules, project timelines and lifecycle service needs to be aligned well in advance.

This has become increasingly important as strong global demand for advanced gas turbines places pressure on manufacturing capacity and specialised components.

At our grid-connected T-Point 2 facility in Takasago, new and modified gas turbine designs are operated under load for at least 8,000 hours before wider deployment.

That is equivalent to nearly a full year of operation and represents a widely recognised industry benchmark for validating reliability and performance.

It provides customers with greater confidence in the durability and operational readiness of the technology before deployment.

Long-term service agreements, local engineering capabilities and regional service infrastructure further reduce operational risk throughout the life of the asset by providing greater predictability around maintenance, availability and performance.

How is Mitsubishi Power adapting the operational flexibility and efficiency of heavy-duty turbines like the M701JAC to support highly dynamic, electricity-driven grid profiles?

Desalination remains a really important part of the GCC's energy demand profile.

However, the challenges it presents to the power system are increasingly aligned with broader trends we're seeing across the region: Rapid demand growth, a growing need for operational flexibility and an unwavering requirement for reliability.

Utilities need generation assets that can respond dynamically to changing electricity demand while maintaining high efficiency, system stability and security of supply.

Qatar's Facility E is a good example of these evolving requirements.

The project will add 2.4 GW of generation capacity, equivalent to around 20 per cent of Qatar's electricity generation capacity, while supporting the production of 495,000 tonnes of desalinated water per day.

Mitsubishi Power will supply four hydrogen-ready M701JAC gas turbines, marking the first deployment of JAC technology in Qatar.

For the turbine, operational flexibility becomes increasingly important.

The M701JAC combines high efficiency with fast response and load-following capability, enabling operators to adjust output as electricity demand changes.

That is particularly important in GCC markets, where demand remains high and is becoming increasingly dynamic, while expectations for reliability remain uncompromising.

Rather than thinking solely in terms of efficient baseload generation, utilities increasingly require generation assets that can do both: operate efficiently at scale when demand is high, while also responding quickly to changing system conditions.

How is Mitsubishi Power managing global supply chain bottlenecks and rising capital costs to ensure the timely delivery of specialised turbine equipment for critical GCC infrastructure projects?

Our priority is to provide customers as much certainty and visibility as possible.

We are strengthening production planning, continuously improving manufacturing efficiency, expanding capacity where necessary and working closely with suppliers.

At the same time, early engagement with customers allows us to understand project schedules and component requirements much earlier in the development cycle.

Localisation is also becoming an increasingly important part of that equation in the Gulf.

Our Dammam factory in Saudi Arabia is the third in the world to have the operational capability to assemble the most efficient machine in the market, the advanced JAC gas turbine.

Additionally, our state-of-the-art facilities across the Kingdom and in the UAE provide localised repair and service capabilities.

Additionally, retrofit, maintenance and life-extension programmes form another important part of the solution.

Where do you see the most critical gap between current policy frameworks and the actual deployment timelines of international equipment manufacturers when trying to fast-track large-scale energy security projects?

Across the GCC, national energy and economic strategies are extremely ambitious and increasingly well defined.

The challenge is translating those ambitions into coordinated execution across the entire energy ecosystem at a time of rapid electrification and unprecedented growth in power demand.

Grid infrastructure, permitting, financing, fuel availability, supply chains and long-term operating requirements all need to advance in a broadly coordinated manner.

For international equipment manufacturers like Mitsubishi Power, early visibility of the project pipeline is particularly important.

Earlier investment decisions and greater certainty around project pipelines enable manufacturers, suppliers and EPC partners to plan capacity, procurement and delivery schedules more effectively.

This is where policy and execution need to connect.

Clear, durable regulatory frameworks and realistic project schedules provide investors and technology providers with the confidence and visibility required to make long-term commitments. ■


Mitsubishi Power's T-Point 2 facility in Takasago, Japan

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Credit: Celtic Renewables

Celtic Renewables biorefinery at Grangemouth near Falkirk in Scotland

Bio-feedstocks offer Mideast refiners vital competitive and resilience advantage

Integrating advanced bio-fermentation into Middle Eastern petrochemical facilities strengthens regional market resilience and protects against tightening carbon regulations, Bettina Brierley tells *OGN*

BY ABDULAZIZ KHATTAK

As geopolitical volatility exposes vulnerabilities in global supply chains, bio-based chemical production is emerging as a critical commercial buffer against severe market disruptions.

The recent surge in acetone prices following the Strait of Hormuz crisis has intensified pressure on industrial operators to diversify away from fossil fuel dependence.

Modern bio-fermentation technologies present an immediate pathway to stabilise solvent markets by transforming abundant waste materials into high-purity, low-carbon alternatives.

Integrating these scalable solutions alongside conventional petrochemical infrastructure allows manufacturers to capture growing demand for sustainable materials without requiring expensive facility overhauls.

In an exclusive interview with ***OGN*** energy magazine, Bettina Brierley, Chief Commercial Officer, Celtic Renewables, says: "Scaling back dependence on and exposure to oil and gas for essential chemicals in favour of low-carbon alternatives is more than ever a long-term commercial and environmental imperative."

Adopting drop-in bio-feedstocks also strengthens the competitive posture of regional exporters navigating stricter international environmental regulations and tightening carbon reporting frameworks.


Credit: Celtic Renewables

Bettina Brierley

Governments mandating minimum bio-based thresholds in chemical manufacturing stand to secure a distinct first-mover advantage in a rapidly evolving global market.

Below are excerpts from the interview:

Given that the Strait of Hormuz crisis has caused acetone prices to quadruple, how rapidly can bio-based chemical producers scale capacity to offer a genuine hedge against geopolitical shocks in global solvent markets?

There are already proven technologies and processes, such as bacterial fermentation, that are ready to scale in a timeframe that would hedge against geopolitical shocks by reducing the chemical sector's exposure to and reliance on fossil fuels.

It typically takes between two to three years to scale a biorefinery from demonstrator level up to industrial-scale commercial facility operations.

Considering the chemical industry abandoned fermentation feedstocks for petrochemicals in the 1950s, what specific technological advances render modern bio-fermentation commercially competitive at global scale today?

Celtic Renewables has reinvented the ABE fermentation process to use by-products and waste materials instead of crop-based feedstocks.

The number one advantage of modern bio-fermentation is its ability to transform at scale waste materials into bio-based chemicals that possess

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similar properties to their fossil-derived equivalents.

This in turn reduces greenhouse gas emissions.

Can your bio-acetone and bio-butanol serve as immediate, 100 per cent drop-in replacements within existing chemical manufacturing facilities without requiring capital-intensive plant modifications?

Our bio-based chemicals require no modifications to existing manufacturing facilities; they are drop-in replacements that don't need any changes to infrastructure or equipment.

Celtic's bio solvents already meet the most stringent existing pharmaceutical chemical specifications and their purity is like for like with fossil-derived counterparts.

How do the production economics and long-term price parity of bio-butanol and bio-acetone hold up once crude oil prices inevitably stabilise after this current supply disruption?

Price levels for bio-based solvents at the moment range from between 1.5 and twice the price of crude oil, depending upon the industry.

These prices will come down and achieve parity with their fossil fuel-based equivalent as new larger biorefining facilities are built and come online to boost production capacity.

The economics and long-term price parity for bio solvents will also be influenced by governmental mandates for the use of green alternatives and increased carbon taxes.

The carbon tax increase is an unknown at this point; however, if this taxation scheme is used to support the use of greener alternatives they are set to increase by a larger proportion.

How does converting low-value industrial by-products into high-value solvents alter the overall carbon intensity and profitability profile of primary feed suppliers?

Using locally sourced feedstocks at nearby productions sites reduces carbon intensity.

Primary feedstock suppliers improve their profitability when they work with us because we solve their waste stream challenge.

Some waste streams might involve high energy consumption conversions while others end up in municipal waste disposal.

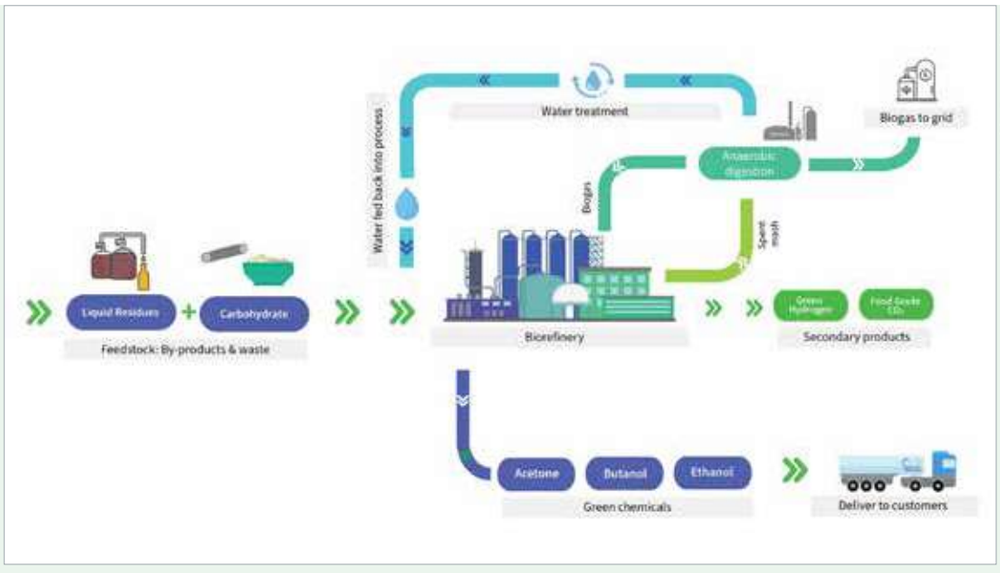
If a supplier's waste stream ends up in an anaerobic digestion plant to produce biogas, feeding it through our fermentation process first increases the yield from the anaerobic digestion.

With major GCC petrochemical producers expanding aggressively into specialty downstream markets, what is the strategic case for integrating bio-based ABE (acetone-butanol-ethanol) fermentation directly alongside conventional steam crackers in the Middle East?

Integrating bio-based production processes alongside conventional steam crackers prepares petrochemical producers to take advantage of the surge in demand for low-carbon bio-based chemicals and materials that are already replacing their fossil-derived counterparts.

Petrochemical producers already have in place suitable infrastructure, which they can use as building blocks to add biorefining capability and diversify their operations.

They can take advantage of the growing international demand for low-carbon chemicals and continue to supply fossil-derived products and materials in a way that accelerates the transition away from fossil fuels in favour of low-carbon alternatives.



Credit: Celtic Renewables

The ABE fermentation process is used to create bio-based chemicals such as bio-acetone, bio-butanol, and bio-ethanol from waste and by-product materials. It has the potential for integration into other processes including water treatment and anaerobic digestion

This dual approach means they can continue to use fossil-derived materials where they are still needed the most, such as transport, and also transition other applications to a sustainable option.

How easily can your proprietary technology be adapted to process alternative organic waste streams prevalent in hyper-arid GCC environments?

A significant part of our growth and investment into research and development (R&D) focuses on the integration of new waste feedstocks that are readily available at a global level.

Our R&D team is currently undertaking trials that use cardboard and other everyday municipal waste materials, in addition to residues from dairy and cheese production.

Furthermore, advancements in the capture and extraction of cellulose from sewage opens up the potential for building biorefinery plants next to wastewater treatment facilities.

These biorefineries would have an inexhaustible supply of recovered cellulose available all year round as a feedstock with which to sustainably produce materials for use in the chemical, industrial and construction sectors.

To what extent can switching to drop-in bio-feedstocks protect the Western market share of Middle Eastern chemical exporters, who face tightening European Scope 3 reporting and mechanisms like CBAM?

The switch to bio-feedstocks is crucial for chemical exporters who want to not only protect but also grow their market share in Western Europe and beyond.

Current Scope 3 reporting mechanisms will only get stricter and focus on the real waste aspect of feedstocks used, to ensure that sustainable alternatives do not cause us other problems in the future.

For example, growing crops purely in order to manufacture chemicals is not a viable solution when one factors in the need for greater food security.

Our bio solvents already deliver a straightforward solution that doesn't compete with agriculture over land use and represents a greenhouse gas saving of more than 60 per cent.

Are you actively seeking joint ventures and technology licensing deals with Middle Eastern sovereign wealth and energy funds?

Our current biorefinery is located in Grangemouth, Scotland, and our next commercial plant will also be located there.

At the same time, we are open to future biorefineries outside Scotland and the UK and eventually to license our technology to third party partners.

High volume users of bio solvents will most likely look for joint venture opportunities to secure enough volume for themselves; whilst regions might look for licensing opportunities as they are trying to deploy their waste feedstocks in another way or build up biotechnology hubs.

Solvents are an integral part of chemical manufacturing and are needed everywhere in the world.

With the shift in feedstock to more accessible feedstocks like municipal waste materials, our fermentation technology and biorefining processes can be licensed for use anywhere in the world where it is needed.

Should Middle Eastern energy ministries begin mandating minimum percentage thresholds for bio-based feedstocks in domestic chemical manufacturing to build long-term economic resilience against future external shocks?

Absolutely, and without delay.

Doing so would accelerate the transition to a more sustainable future for all of us.

Fossil fuels have been instrumental in driving innovation and growth: Raising living standards: and generating wealth and prosperity for the world; and they will still be needed for the foreseeable future.

Governments who mandate a switch to sustainable bio-based chemicals won't be weakening their domestic chemical industry.

On the contrary, they're taking the lead and providing a template that encourages other countries to follow suit.

They'll also secure first mover advantage in what will be a rapidly expanding and increasingly competitive international market.

The combination of the climate emergency and the pressing need to reduce harmful emissions, together with a resurgence in geopolitical tensions and uncertainty, are reshaping entire industries and supply chains alike.

Scaling back dependence on and exposure to oil and gas for essential chemicals in favour of low-carbon alternatives is more than ever a long-term commercial and environmental imperative. ■

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Middle East energy producers accelerate decarbonisation through heat integration

Advanced thermal management technologies deployed by Alfa Laval optimise industrial energy efficiency, lower carbon capture costs, and enhance regional value chains, Alban Hohmann-Schauly tells *OGN*

BY ABDULAZIZ KHATTAK

ALFA Laval is deploying high-efficiency heat recovery and compact plate exchanger technologies across Middle Eastern energy facilities to minimise energy penalties, eliminate process bottlenecks, and optimise solvent regeneration within mega-scale carbon capture hubs.

By integrating advanced thermal management across refinery retrofits, electrolyser cooling loops, and green ammonia synthesis systems, the company is enabling regional producers to achieve rapid Scope 1 reductions while meeting stringent global decarbonisation benchmarks.

In an exclusive interview with ***OGN*** energy magazine, Alban Hohmann-Schauly as Vice President, Energy Division for Alfa Laval Middle East, South and East Africa (MESEA), says: "At Alfa Laval, we help reduce the energy penalty of solvent regeneration by maximising heat recovery within the solvent loop."

He adds that combining high-efficiency heat recovery with local assembly capabilities strengthens asset lifecycle support across the region.

Below are excerpts from the interview:

Given that operational energy efficiency represents the fastest route to Scope 1 reductions, what proven pay-back periods can regional refinery operators anticipate when retrofitting legacy process units with your compact exchangers?

There is no single payback period because the economics depend on the duty, energy prices, operating hours, process configuration and condition of the existing equipment.

But Alfa Laval has demonstrated paybacks ranging from months to less than a year in relevant industrial applications.

In one refinery case, replacing a shell-and-tube exchanger with a Compabloc in a crude distillation unit delivered an expected 9.2 per cent reduction in energy use, reduced CO_2 emissions by around 8,000 tonnes per year and achieved a payback period of less than one year.

In another Alfa Laval service case, modifying an existing plate heat exchanger to compensate for changing crude properties eliminated the need for preheating burners.

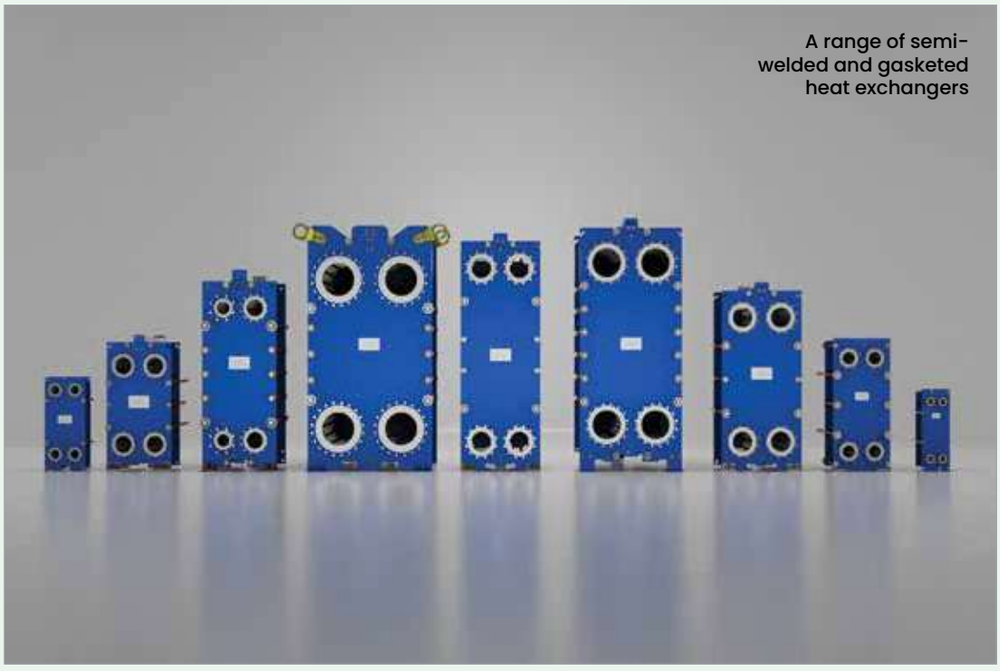
The investment paid back in less than three months.

So rather than promising a standard return, our approach is to assess each existing process and quantify the energy, emissions and maintenance opportunity before recommending a retrofit.

How does Alfa Laval intend to assist Middle Eastern operators in mitigating the excessive parasitic energy penalty incurred during solvent regeneration in mega-scale CCUS hubs?

At Alfa Laval, we help reduce the energy penalty of solvent regeneration by maximising heat recovery within the solvent loop.

Using our fully welded Compabloc technology, we can achieve very close temperature approaches in lean-rich solvent heat exchange, significantly reducing reboiler steam demand.



A range of semi-welded and gasketed heat exchangers



Alban Hohmann-Schauly

The compact design also provides lower solvent hold-up and shorter residence times, which helps minimise thermal degradation of the solvent and can contribute to lower solvent makeup requirements.

For large CCUS hubs in the Middle East, this combination of efficient heat recovery, reduced steam consumption, and improved solvent management can play a major role in improving overall capture economics and energy efficiency.

Following your supply contract with Saipem for large-scale carbon capture technology, what specific thermodynamic efficiency gains can regional energy producers expect when deploying your plate heat exchangers over traditional shell-and-tube designs?

By leveraging Alfa Laval's high-efficiency plate heat exchanger technology, operators can achieve closer temperature approaches, higher heat transfer coefficients, and lower exergy losses than conventional shell-and-tube designs.

This enables the recovery of valuable low-grade heat, reduces steam and utility consumption, and improves overall process integration across the capture cycle.

The result is a lower cost of CO_2 capture, higher energy efficiency, and a more sustainable operation.

The Saipem project is a strong example of how Alfa Laval's advanced heat transfer technology unlocks maximum heat recovery and enhances the economics of large-scale carbon capture facilities.

How are your heat transfer solutions enabling Middle Eastern hydrogen exporters to achieve the thermal efficiency required to comply with strict European Carbon Border Adjustment Mechanism (CABM) standards?

As Middle Eastern hydrogen producers target export markets where carbon intensity is increasingly scrutinised, maximising energy efficiency is critical.

Alfa Laval supports this through advanced thermal management solutions across the hydrogen value chain, particularly in electrolyser cooling and heat recovery.

Our compact plate heat exchangers deliver high thermal effectiveness, enabling tighter temperature control, improved heat recovery, and enhanced utilisation of process energy.

We also see significant potential in harnessing low-grade waste heat from electrolyser systems through Alfa Laval's innovative freshwater generators, converting otherwise rejected thermal energy into valuable freshwater.

What engineering solutions is Alfa Laval applying to eliminate thermal bottlenecks in high-pressure green and blue ammonia synthesis loops across the GCC?

Alfa Laval is eliminating thermal bottlenecks in high-pressure green and blue ammonia synthesis loops through advanced heat integration.

This includes systems, such as our specialised OLMI Synloop Waste Heat Boilers (WHBs), Packinox feed-effluent interchangers, high-efficiency Compabloc heat exchangers, and semi-welded and gasketed plate heat exchanger portfolio.

By recovering reaction heat as high-pressure steam, lowering feed temperatures through improved feed-effluent exchange, and minimising exergy losses across the synthesis loop, these solutions maximise energy recovery and reduce compressor and utility demand.

The result is a higher loop efficiency, increased plant throughput, improved steam generation, and lower specific energy consumption, helping GCC producers improve both ammonia economics and decarbonisation performance.

How is Alfa Laval adapting its high-compactness heat recovery technology to withstand the extreme ambient operating conditions and high fouling rates characteristic of GCC downstream facilities?

GCC downstream facilities face a challenging combination of high ambient temperatures, demanding cooling-water conditions, and heavily fouling process streams.

Alfa Laval addresses these challenges through heat exchanger technologies specifically engineered for severe operating environments.

Alfa Laval's gasketed plate heat exchangers can also operate at very low LMTDs, enabling closer temperature approaches and maximising heat recovery from available process streams.

While Compabloc combines fully welded construction with optimised corrugation patterns that generate high turbulence and shear stresses at the heat transfer surface, helping mitigate fouling while maintaining thermal performance.

For severe fouling duties, Spiral Heat Exchangers utilise a single-channel design that promotes a self-cleaning effect.

Combined with tailored material selection and lifecycle support, these solutions maximise uptime, sustain heat recovery efficiency, and reduce operating costs.

In a region facing severe water scarcity, how do your thermal management designs minimise freshwater cooling consumption in energy-intensive industrial operations?



The Smart Heat Exchanger

In water-stressed regions such as the Middle East, thermal and water efficiency must be optimised together.

Alfa Laval's compact heat exchangers achieve high heat transfer coefficients and operate at very low LMTDs, enabling greater process-to-process heat recovery and reducing the thermal load on cooling systems.

This lowers cooling-water demand and overall utility consumption.

Beyond conventional heat recovery, Alfa Laval also sees significant potential in utilising low-grade waste heat that would otherwise be rejected to drive freshwater generation from seawater.

By converting waste thermal energy into a valuable resource, operators can improve both water security and overall plant sustainability while reducing the environmental footprint of energy-intensive operations.

How is Alfa Laval supporting energy and data infrastructure operators across the Middle East in balancing high-duty cooling demands with stringent environmental targets?

As computing density increases, cooling has become a critical component of the overall energy balance, accounting for a substantial share of data centre power consumption.

Alfa Laval addresses this challenge through advanced thermal management technologies, including compact plate heat exchangers, liquid cooling, free cooling, and heat recovery systems.

The high heat transfer coefficients and ability to operate at very low temperature approaches enable efficient heat removal with minimal energy input.

Beyond cooling, Alfa Laval sees significant potential in recovering low-grade waste heat for seawater-based freshwater generation, transforming otherwise rejected thermal energy into a valuable resource while improving both water security and the sustainability of energy-intensive infrastructure.



The Compabloc in production

How are digital condition monitoring and predictive maintenance services being integrated into your regional service agreements to ensure zero unplanned downtime for mission-critical decarbonisation assets?

Digitalisation is transforming equipment maintenance from calendar-based schedules to condition-based decision making.

Alfa Laval's digital services combine condition monitoring, performance analytics, and application expertise to provide real-time visibility into the health of critical heat transfer equipment.

For plate heat exchangers, continuous monitoring can detect changes in thermal and hydraulic performance, fouling, and other early indicators of degradation.

This enables operators to optimise maintenance intervals, improve energy efficiency, extend asset life, and reduce unplanned downtime.

By combining digital tools with Alfa Laval's engineering and service expertise, customers can maximise equipment availability, reliability, and performance throughout the asset lifecycle.

With regional national oil companies (NOCs) prioritising in-Kingdom total value add (iktva) and In-Country Value programmes, what concrete steps is Alfa Laval taking to expand its local manufacturing and service footprint within the GCC?

Saudi Arabia is a strategically important market for Alfa Laval, and localisation is a key part of how we support customers across the GCC.

Through our Made in Saudi initiative and local assembly capabilities, we are bringing manufacturing, engineering expertise, and service support closer to the market, enabling faster response times and greater local value creation while maintaining Alfa Laval's global quality standards.

We continue to invest in local talent, technical capabilities, and lifecycle services to strengthen our regional footprint.

By combining global technology with local execution, Alfa Laval supports customers throughout the asset lifecycle while contributing to iktva objectives and the Kingdom's industrial localisation ambitions. ■

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Visitors discover cutting-edge automation platforms, regional manufacturing milestones, and advanced digital solutions designed to optimise operational efficiency and shape the future of modern drilling



Delivering high-performance drilling

As operators increasingly pursue unconventional resources, Nabors continues to leverage expertise developed across the US, Argentina, and Saudi Arabia to help customers overcome complex drilling challenges and improve well economics.

Through advanced rig technologies, engineering expertise, automation, and digital solutions, Nabors has consistently reduced drilling days and improved overall well delivery performance in unconventional plays.

The company's leadership in high-pressure drilling, including rigs capable of supporting 10,000 psi mud systems, positions Nabors to address increasingly complex well designs while helping customers improve efficiency, reliability, and operational outcomes.

Looking ahead, growing demand for unconventional resource development is expected to create new opportunities for Nabors to deploy its technologies, expertise, and performance-driven solutions across international markets.

In the US, Nabors has drilled more than 280 million ft of unconventional wells while reducing average drilling days from 19.39 to 13.23 in 2025.

Similarly, in Argentina, more than 13.5 million ft of unconventional wells have been drilled, with average well delivery times reduced from 39.94 days to 18.11 days, demonstrating the impact of continuous improvement and technology-enabled drilling performance.

> ***Nabors is well positioned to transfer proven solutions and lessons learned from some of the world's most successful unconventional basins to Middle Eastern operations***

As unconventional resource development gains momentum across the region, the company is well positioned to transfer proven solutions and lessons learned from some of the world's most successful unconventional basins to Middle Eastern operations.

AUTOMATION & DIGITALISATION IN DRILLING OPERATIONS

Throughout 2026, Nabors continued to advance the use of automation and digitalisation across its Eastern Hemisphere drilling operations.

Through solutions such as the SmartROS® automation technology, SmartDRILL® process automation, the RigCLOUD® digital platform, and other digital applications, operators are able to standardise workflows, improve operational consistency, optimise drilling performance in real time, and reduce human exposure to higher-risk activities.

Nabors' SmartDRILL® process automation platform has demonstrated connection time savings of up to 33%, supporting safer, more efficient, and more predictable drilling operations in Saudi Arabia.

Building on the continued growth of the RigCLOUD® digital platform portfolio, the team is preparing to deploy RigCLOUD NexGas™, a fixed gas detection solution that combines fixed H_2S and LEL (lower explosive limit) gas detection with local alarming and real-time remote visibility through

the RigCLOUD® platform, helping onsite drilling teams identify hazardous conditions earlier and respond more effectively.

Designed for drilling operations and harsh industrial environments, this solution enhances safety management while supporting more informed, data-driven decision-making.

ABU DHABI FACILITY EXPANSION & MADE IN THE UAE

A key milestone in 2026 was the launch of Nabors' expanded Abu Dhabi facility, strengthening regional operations through integrated service delivery and enhanced operational efficiency.

The facility serves as a strategic hub for customers across the Middle East, providing a broad range of capabilities including fishing and remedial tools, tubular running services (CDS and conventional), fabrication and repair, pressure control equipment rentals, specialised downhole tools, and drilling jar supply and rental services.

The investment reflects Nabors' commitment to delivering faster response times, localised support, and operational excellence across the region.

Another significant milestone is the continued expansion of Canrig's UAE operations, bringing decades of manufacturing expertise to the Middle East and North Africa.

Canrig's UAE facility supports the manufacture of Top Drives, Guide Dollies, and the Canrig Casing Drive System™ (CDS), while also providing recertification, repair, and aftermarket support services for both Canrig and third-party equipment used throughout the region.

The facility further strengthens Nabors' in-country capabilities, providing customers with locally supported technology, aftermarket services, and technical expertise while reducing lead times and enhancing operational efficiency.

In 2026, Canrig also became the first company in the Mena region to achieve official American Petroleum Institute (API) 8C certification, reinforcing the UAE facility's role as a regional centre for quality, manufacturing excellence, and innovation.

REGIONAL EXPANSION

Nabors is also continuing to strengthen its regional manufacturing and service footprint through Canrig's facility in Dammam, Saudi Arabia. It is strategically located to support customers across the Kingdom and the wider region.



Integrated services under one umbrella

Together with Canrig's UAE operations, the Dammam facility enhances local content, reduces delivery timelines, and brings technology, expertise, and service capabilities closer to the field.

This investment supports the growing demand for high-performance drilling solutions while reinforcing Nabors' commitment to developing in-country manufacturing and operational capabilities in the Kingdom and beyond.

The introduction of the Canrig Titan™ automated wrench to the Eastern Hemisphere marks the next phase of Canrig's global automation strategy.

Built on proven field performance and validated by customer feedback, the Canrig Titan™ wrench is positioned to help drilling contractors improve connection quality, increase productive rig time and reduce total cost of ownership.

As demand grows for safer, more efficient and more consistent drilling operations, the Canrig Titan™ automated wrench provides a practical automation solution that helps customers meet today's operational challenges while preparing for the future.

WHAT TO EXPECT AT ADIPEC 2026

At ADIPEC 2026, Nabors will showcase how technology, safety, operational performance, and regional investment are shaping the future of drilling.

Visitors can expect to explore advanced automation and digital solutions, learn about the Canrig Titan™ automated wrench, discover the capabilities of the Abu Dhabi facility, and see how Nabors is helping customers achieve more efficient and streamlined drilling operations. ■

Visit Nabors at Stand 6331, Hall 6 to learn more.



Record-breaking drilling excellence

UAE energy sector builds psychological safety into core operational health

High stress levels and extreme working conditions prompt regional energy operators to embed mental healthcare within safety management frameworks, Shabnum Hanif, Founder and CEO, IntrospeXion tells *OGN*

THE high-stakes and high-intensity working environment of the UAE's oil and gas sector places a unique challenge on the region's workforce, extending far beyond traditional health and safety.

Long hours in extreme conditions exacerbate feelings of stress and isolation that are synonymous with the industry's demanding workplace culture.

Recognising this, psychological safety has become an integral component of HSE practices and strategy, with peer-driven support networks and a rise in education and resources for identifying the early signs of psychological challenges.

WELLBEING IN THE UAE'S ENERGY SECTOR

Understanding the current state of wellbeing and mental health in the UAE's energy sector and the challenges that surround it often comes down to cultural and operational factors.

Different languages, experiences, skill sets, and lifestyles all come together with a shared goal: To support the region's energy infrastructure and objectives.

Expatriates account for about 90-95 per cent of jobs in key economic industries in the private sector, including the local energy market.

Differences in language, culture, communication style, and attitudes towards hierarchy can affect how support networks are established, mutual awareness and understanding of mental health, and how comfortable we are opening up with one another.

Additionally, the Gulf Cooperation Council (GCC) reports workplace stress levels much higher than the global average (by approximately 17 points), with the UAE featuring the highest stress rates with as much as 90 per cent of the population experiencing stress, contributing to UAE businesses losing AED3.9 billion ($1 billion) in lost productivity every year.

For an industry so reliant on an international workforce, organisations need approaches and frameworks that account for different cultures, languages, leadership expectations and experiences of speaking up.

Operationally, the energy industry takes its workforce to remote and high-risk environments, working in rotational and volatile patterns where extended periods away from support networks and last-minute changes are common.



Providing critical support in remote locations



Shabnum Hanif

In these environments, where the pressure is on, and health and safety risks can intensify anxieties and stresses, there's very little opportunity to step away from operational tensions.

Stress and fatigue are two of the most significant hazards, particularly where long hours, demanding schedules, disrupted sleep, and sustained operational pressure combine.

In operating environments, personnel are exposed to acute stress that is unique to the energy industry, all the while simultaneously being expected to make clear, high-consequence decisions.

When stress and fatigue build up, reduced hazard awareness, slower reaction times, impaired judgement and decision-making, increased likelihood of procedural violations, and communication breakdowns are all common risks.

Elsewhere, rotational work creates additional strain through separation from family, difficulty switching off between rotations, and the cumulative impact of repeated periods away from home.

Collectively, these challenges only highlight the need for psychological preparedness and a robust wellbeing strategy.

INTEGRATING WELLBEING INTO HSE & HR STRATEGY

Leaving wellbeing out of the overall HSE strategy doesn't just impact your people; it impacts your bottom line.

Sickness absences, staff turnover, and reduced productivity attributed to stress, fatigue, burnout, depression, and anxiety cost employers billions every year.

Launched in 2024, the UAE's National Strategy for Wellbeing 2031 aimed to platform the country as a leader in quality of life.

Included in the strategy were expectations for how employers invest in workplace wellbeing.

On paper, this is something that companies have demonstrated their willingness to adapt. But dig deeper, and the facts aren't as promising.

Recent in-country reports found that 88 per cent of UAE employers have boosted wellbeing budgets in 2026.

While this itself suggests a positive step, the reality doesn't quite match up.

The same report found that 67 per cent of UAE organisations rely on generic webinars as the cornerstone of their wellness strategy.

Since launching IntrospeXion's Middle East entity in early 2026, from our base of operations in the UAE, we have been visiting operators and supply chain across the region, including offshore sites, to provide onsite mental health hubs and drop-in clinics, audits and assessments, and coaching opportunities.

Currently, our ongoing work with a major regional operator to deliver a company-wide mental health and wellbeing programme is proof of changing attitudes.

The programme aims to strengthen psychological health, leadership capability and workforce resilience across the client's UAE operations, integrating psychological profiling, psychological risk assessments, wellbeing workshops, confidential employee support, and critical incident response amongst other services.

Wellbeing reports have found that fully embedded and effectively implemented wellbeing programmes can deliver 25 per cent increase in productivity gains in the GCC, an 11 per cent increase in revenue per employee, while IntrospeXion has reported an average ROI of 7x the cost of employing a coach.

Workforce engagement is becoming more visible through initiatives, such as confidential drop-in clinics, leadership workshops, behavioural-risk programmes and direct access to qualified psychological support.

One of the biggest risks is the gap between what an organisation believes it has communicated and what the workforce has actually understood.

The operators who get the best out of their team will be those that move beyond simply having policies written down, and instead create multiple, accessible routes for people to raise concerns and seek support before issues escalate.

Organisations are also starting to connect workforce wellbeing data with operational risk, rather than

treating wellbeing as a separate HR activity.

The next evolution of HSE is not replacing existing systems, but integrating psychological risk into them so that wellbeing, behavioural risk and operational safety are managed together.

Most importantly, the strongest approach is integrated: Embedding psychological safety into existing HSE and operational systems, with leaders, supervisors and workers all understanding their role in identifying and managing psychosocial risk.

Ultimately, psychological safety should become part of the same conversation as physical safety. Operators and supply chain need to create an environment where people can perform at their best, challenge risk, and go home safely.

CASE STUDY: CRITICAL INTERVENTION FOR A HIGH-RISK OFFSHORE WORKER

Without a specialised and private space for personnel to disclose concerns and anxieties when working in high-pressure and isolating offshore environments, it can be difficult understanding what is going on in someone's head.

During a routine rotation on a major offshore installation, a staff member requested a confidential session with an IntrospeXion psychologist.



IntrospeXion travels offshore to deliver on-site support

After spending time with our on-site psychologist, the individual expressed worrying signs, including feelings of hopelessness, emotional distress linked to personal and work triggers, and withdrawal from colleagues.

This was a high-risk scenario in one of the most isolated environments possible.

With limited medical resources offshore and no immediate access to care, the situation required urgent, expert intervention.

IntrospeXion's offshore-certified psychologist conducted an immediate risk assessment, followed by a structured safety plan.

- **Rapid response:** The individual was seen within minutes of raising concerns, no waiting lists, no delays, no barriers.
- **Clinical risk assessment:** A full psychological evaluation was carried out to identify intention, means, protective factors, and immediate triggers.
- **Crisis containment and emotional stabilisation:** We used evidence-based techniques to de-escalate intense emotional distress and bring the individual back to a safer psychological state.
- **Coordination with leadership:** We worked discreetly with the OIM to ensure the worker was not left alone; their safety was continuously monitored; and the situation was handled with dignity and privacy.
- **Safe repatriation:** A structured and compassionate handover was coordinated with the OIM, medic and onshore duty-holder to ensure continuity of care upon return.

After consultation and once back onshore, the individual continued receiving psychological support through IntrospeXion and a trusted Employee Assistance Programme (EAP).

Within weeks, the individual reported feelings of increased stability, stronger coping strategies, and renewed confidence to return to work safely when appropriate.

High-risk psychological cases offshore are rare, but extremely serious.

In isolated environments with reduced medical capability, a mental health crisis can escalate quickly.

When an organisation cannot demonstrate adequate support for personnel at risk, the human, operational, and reputational impact can be severe.

This case highlights why having real psychologists offshore is not just beneficial, it is essential.

Clinical expertise, crisis management, and behavioural insight cannot be replicated by generic wellbeing providers.

When lives, safety and organisational integrity are on the line, a proactive wellbeing approach delivers where it matters most. ■



Lummus' technology sets 'world record' in mega scale propane dehydrogenation

Integrating CATOFIN mega-scale units into ZPC's mega-refining complex optimises capital efficiency and delivers lower production costs, Romain Lemoine tells *OGN*



A large scale plant using Catofin technology

BY ABDULAZIZ KHATTAK

ZHEJIANG Petroleum and Chemical (ZPC) selected Lummus Technology's CATOFIN process to construct a record-breaking 1.2 million metric tonnes per annum (mtpa) propane dehydrogenation unit, setting a new capacity benchmark for the global petrochemical industry.

The decision to displace the complex's former technology licensor reflects growing market demand for ultra-large single-train units capable of delivering operational reliability beyond initial design specifications.

In an exclusive interview with ***OGN*** energy magazine, Romain Lemoine, Chief Business Officer, Lummus Technology, says: "Zhejiang Petroleum and Chemical's priority was to achieve greater capacity. So, they turned to Lummus because CATOFIN is known in the market for delivering beyond nameplate capacity."

By employing parallel reactor configurations rather than altering core vessel architecture, the facility scales throughput without introducing fluid-dynamic stresses or accelerated catalyst degradation risks.

Below are excerpts from the interview:

What specific operational performance or yield deficiencies in ZPC's legacy PDH technology prompted them to displace their previous licensor in favour of CATOFIN for this record-breaking unit?

Zhejiang Petroleum and Chemical's (ZPC) priority was to achieve greater capacity. So, they turned to Lummus because CATOFINTM is known in the market for delivering beyond nameplate capacity.



Romain Lemoine

Although we licence for a specified capacity, our customers know from our track record that we can exceed it.

This particular ZPC propane dehydrogenation (PDH) unit will have a capacity of 1.2 million metric tonnes per annum (mtpa), which will make it the world's largest licensed PDH unit.

Our technology is recognised for its ability to consistently meet or exceed design capacity while delivering industry-leading operational reliability.

Replacing a core process technology within an established mega-refining complex carries immense risk, so how did Lummus de-risk the integration phase for ZPC during the bidding process?

To ensure we really understood the challenges ZPC was looking to solve, we connected with them at every level, from the experts working directly with the technology to the company's leadership.

We call this the "zipper" approach.

Our teams are connected at every level, with leadership working with leadership, commercial teams working together, and our subject-matter experts engaging directly with their counterparts.

That alignment allows us to work seamlessly with ZPC and identify the optimal way to integrate the technology into their complex.

This ability to reliably scale and deliver capacity is one of the reasons CATOFIN has become the leading PDH technology in China.

ZPC and its affiliates have long relied on Lummus technologies across their operations, licensing technologies, including CDAlky, ISOCRACKING, DPC and butadiene extraction, and their selection of Lummus' PDH technology underscores the depth of our partnership.

Given that scaling a single-train unit to 1.2 mtpa

introduces severe fluid-dynamic and thermal stresses, how has Lummus re-engineered the reactor bed configuration to ensure mechanical integrity?

Lummus has decades of experience with CATOFIN and a history of maximising PDH capacity.

We are known in the market for overdelivering, and the previous capacity benchmark of approximately 900 kilotonnes per annum (KTA) was achieved with our technology.

That experience, combined with the way CATOFIN is designed, enables us to scale without introducing additional mechanical integrity or scale-up risk. CATOFIN uses multiple reactors operating in parallel, so as capacity increases, we adjust the number of reactors rather than fundamentally changing the reactor design.

These designs are already part of our technology platform and proven approach.

How do you mitigate the risk of catalyst degradation and run-length degradation when operating the cyclic CATOFIN process at such an unprecedented throughput?

The scale does not introduce additional catalyst risk, and similar to the reactor design, the equipment is already sized and proven.

At this capacity, we are simply using more reactors rather than fundamentally changing the design.

That allows us to achieve the higher throughput without introducing new catalyst degradation risk.

With single-train downtime incurring massive financial penalties at 1.2 MTPA scale, what specific redundancy and heat-recovery features have been incorporated to guarantee maximum stream factors?

Redundancy is inherent to the CATOFIN design, so no additional equipment, and thus investment, is required.

Everything is connected automatically, with the feed switching from one reactor to another as the reactors rotate through the cycle.

This allows the overall process to remain continuous and achieve close to 99 per cent on-stream time, even as we increase capacity.

That built-in redundancy is a direct result of Lummus' innovation.

We have engineered CATOFIN so that the ability to maintain on-stream performance is fundamental to how the technology operates, rather than something that needs to be added as we scale.

An important differentiator is that the design itself does not change at higher capacities, allowing us to apply the same proven operating approach at 1.2 MTPA.

With similar technologies one reactor can bring the unit down.

But with CATOFIN, Lummus' innovative design provides that redundancy inherently, helping maintain operation and maximise on-stream time.

How does this mega-scale unit achieve a competitive breakeven point on propane-to-propylene conversion in the Asian petrochemical market?

Mega-scale projects are common in the Asian market, and this is where we have already seen PDH units reach the previous capacity benchmark of approximately 900 KTA.

At this scale, there is a clear economic advantage: The larger the unit, the greater the opportunity to reduce capex on a per-tonne basis.

At ZPC, that advantage is combined with integration into its existing complex, which creates additional opportunities to optimise opex.



A HDP unit at a facility

The economies of scale and integration result in a lower cost of production and help minimise the impact of market price fluctuations.

We worked closely with ZPC to look at the overall complex and determine how to integrate the unit to maximise the return on their investment.

Personally, I have worked on many projects in China dating back nearly 15 years, and I have spent months at a time working with customers as well as starting up units.

That's what our staff is trained to do day in day out: never leave the customer.

Our experience and continued engagement with customers help us deeply understand their needs, their specific pain points, and how our technology can help them capture greater returns on their investments.

How does the Lummus-Clariant catalyst system optimise selectivity to handle potential variations between imported waterborne LPG and ZPC's internal refinery-grade propane feedstocks?

Our catalysts do not contain noble metals, which are typically more susceptible to contaminants.

That makes the CATOFIN catalyst system more robust and provides greater feedstock flexibility.

We also have experience across different feedstocks.

The technology can process C4 and C5 feedstocks, with commercial units operating around the world.

That flexibility allows us to tailor the technology based on the feedstock and the end product the customer wants to produce.

Considering the high energy intensity of propane dehydrogenation, what novel decarbonisation technologies or waste-heat utilisation mechanisms are embedded in this latest CATOFIN design?

We're always looking for ways to improve heat integration and energy recovery with every new CATOFIN design.

There is not a one-size-fits-all answer because every customer and every complex is different.

We tailor the design around the site and look for the greatest practical energy gains available within that configuration.

For ZPC, that means looking beyond the PDH unit itself and considering how it integrates with the broader complex.

Better integration lets us identify opportunities to recover and use energy more efficiently across the site.

How significantly does the high-purity hydrogen byproduct generated by this unit enhance the overall carbon and economic balance of ZPC's broader refining footprint?

Hydrogen is a valuable byproduct of the PDH process, particularly within a large integrated refining and petrochemical complex.

The hydrogen produced by the unit can be used elsewhere in the refinery for hydrogen-consuming processes such as hydrogenation, hydrocracking, or hydrotreating.

That can reduce the amount of hydrogen that has to come from a dedicated, on-purpose hydrogen production unit, providing a credit of more than 10 per cent on the overall opex cost.

This is an example of why we look at the economics of the entire complex rather than evaluating the PDH unit in isolation.

With CATOFIN capturing a majority of recent PDH awards globally, how is Lummus managing supply chain and manufacturing capacity to deliver these increasingly massive reactor systems without operational delays?

Customers come to us for our expertise in technology.

While Lummus does not manufacture equipment, we work with fabricators to optimise our custom designs.

We understand speed and accuracy are paramount to our partners, and we are always looking at our execution processes and design criteria to identify best practices.

We are using new digital and AI-enabled tools to accelerate that work while continuing to tailor the design to each customer.

Capacity is the starting point here.

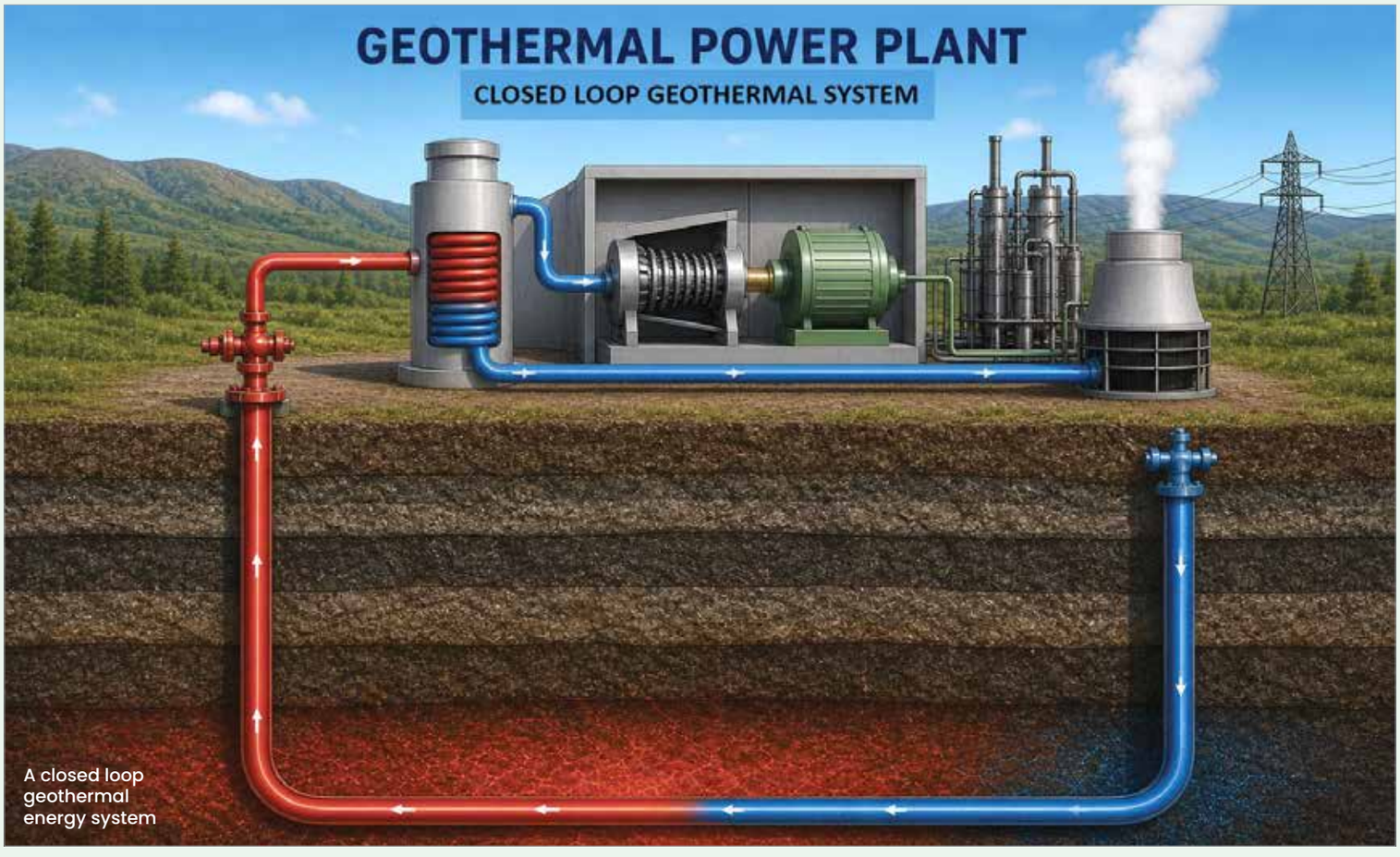
Depending on how much propane the customer needs to process, we can build from an existing design and tailor it to their requirements or start from scratch based on the specific needs of the site, including heat integration.

With the new tools we are developing, we can deliver those customised designs in less time than before.

We are known in the market for exceeding capacity needs, and that track record is one of the reasons CATOFIN has become a technology of choice in China. ■

Geothermal energy offers vast clean power potential across Middle East

Mena region countries are increasingly exploring geothermal resources to reduce carbon emissions, cool urban infrastructure, and accelerate regional renewable energy targets, By Dr Saleha Kuzniewski tells *OGN*



A closed loop geothermal energy system

IN 2023, Engie that owns 40 per cent of Tabreed announced that it had developed the Middle East's first geothermal-powered district cooling plant, called G2Cool.

Explaining the process, Antonio Di Cecca, COO of Tabreed, said the system relied on two geothermal wells, each 2.5 km deep.

Hot water was extracted at 90 deg from the first well and the heat from this hot water powers an absorption chiller that produced chilled water for the urban cooling network.

After its use, the water was reinjected into a second well to form a closed-loop system.

The use of this system lowered the electricity use by three times.

"That translates to 3,000 megawatt-hours (MWh) saved and 1,000 tonnes of CO_2 emissions avoided, enough to cool the equivalent of 150 homes in the sweltering Middle Eastern climate," according to Engie's website.

This is an example of the use of geothermal energy to mitigate climate change, specifically the use of geothermal energy to cool homes.

WHAT IS GEOTHERMAL ENERGY?

Deep within the Earth's crust, there are rocks and fluids at extremely hot temperature.

When this thermal energy is extracted using drilled wells into the Earth's crust, the extracted energy is known as geothermal energy.



Dr Saleha Kuzniewski

"Geothermal energy is a renewable energy source harnessed from the thermal energy stored in rocks and fluids deep within the earth's crust," says the European Commission's website for geothermal energy.

According to the 2026 Cleantech OpenLetter, geothermal energy could generate 301 terawatt-hours (TWh) of electricity in the EU annually, equivalent to approximately 42 per cent of the European Union (EU) coal- and gas-fired generation.

To accelerate the EU's transition to renewable energy, the EU's Amending Directive includes the renewable energy target of 42.5 per cent as a mandatory level and states that the member states should aim to achieve an overall renewable energy target of 45 per cent to be in accordance with the REPowerEU Plan.

The term "renewable energy" in the 2018 Directive and the Amending Directive includes geothermal energy in its definition located in Article (1) (a).

GEMOTHERMAL'S PROMISING FUTURE IN MENA

Among Mena countries, Morocco has a legal framework in Law 13-09 to develop renewable energy projects and it also includes geothermal energy in its definition for renewable energy.

The future for geothermal energy in Mena countries is promising due to The Clean Air Task Force report showing the presence of superhot rock resources, also illustrated in its global maps.

"Just 1 per cent of the Middle East and North Africa's superhot rock resource has the potential to provide 7.2 terawatts of energy capacity, which could generate nearly 60,000 TWh of electricity,"

says the article by Clean Air Task Force.

Superhot rocks are rocks at temperatures above 375 deg C and the heat from these rocks are captured using enhanced geothermal systems (EGS) to produce electricity unlike conventional geothermal energy extraction that involves relying on naturally-occurring steam or hot spring reservoirs.

In EGS, drilling fluid is circulated at depths of more than 5 km into the Earth's ground to reach hot rocks at temperatures of more than 375 deg C to capture the heat.

Besides significant costs for drilling materials, such as polycrystalline diamond cable, drill bit designs, and drilling into superhot rocks, the use of EGS in superhot rocks still needs to be explored.

Geothermal energy is a renewable, clean energy source; therefore, it is also a useful source of energy to mitigate climate change.

An evaluation of literature review using the PRISMA framework showed that geothermal systems emits significantly less carbon dioxide than fossil fuels and results in long-term investment despite the high initial cost of establishing the geothermal energy extraction systems.

Huge lava fields, known as Harrat, extend along the coast of the Red Sea in Western Saudi Arabia.

The Western part of Saudi Arabia also contains orogenic granite with high radioactive content, specifically uranium, thorium, and potassium with a maximum heat generating capacity of 134 µW/m3.

However, a recent study found that mineral features indicate there were once hydrothermal systems in the Northern Harrat volcanic regions and estimated that geothermal systems could be operative if built at depths of nearly 6 km.

> ***Just 1 per cent of the Middle East and North Africa's superhot rock resource has the potential to provide 7.2 terawatts of energy capacity, which could generate nearly 60,000 TWh of electricity***

Mena countries are investing in geothermal energy.

"Grow contribution of renewables to national energy mix" is one of the strategic objectives in Saudi Arabia's vision 2030 and geothermal energy is renewable energy.

In 2025, EDF Saudi Arabia and TAQA Geothermal Energy signed a memorandum of understanding to collaborate on geothermal energy technologies in Saudi Arabia.

And there are other Mena countries exploring geothermal energy as the future of renewable energy in the light of concerns about climate change.

"The UAE Energy Strategy 2050 aims to triple the contribution of renewable energy by 2030 and mobilise national investments of AED150-200 billion ($41-55 billion) over the same period to ensure that the country's growing energy demand is met in line with its rapid economic growth," said the statement on the UAE Energy Strategy 2050's website.

G2Cool is an example of how to use geothermal energy to mitigate climate change.

Made possible by ADNOC's $15 billion, it accounts for 10 per cent of Masdar City's cooling needs. The future looks promising due to MENA's strategic objectives and partnerships. ■

Dr Saleha (Sally) Kuzniewski is a scientist and a writer. In addition to her work at the US Geological Survey on bioremediation and microbial ecology projects, she has also authored several scientific publications in wastewater treatment and technologies. She is the recipient of the 2026 Jesse H Neal award in the Best GEO Initiative and the 2023 APEX award for publication excellence. Dr. Kuzniewski received her BS degree in Biology from William Smith College, Master of Environmental Science degree from Memorial University of Newfoundland, and her PhD degree from George Mason University.



Holistic fire and gas detection strategies protect complex energy facilities

Modern oil and gas operators must carefully balance growing operational demands and risk management using multi-layered safety technologies, Kevin Killeen tells *OGN*

As oil and gas facilities become increasingly complex, fire and gas detection remains a critical part of protecting people, assets and operations.

But an effective strategy involves more than simply installing detectors.

In an interview with ***OGN*** energy magazine, Kevin Killeen, Global Product Line Manager, Flame & Open Path Gas Detection, MSA Safety discusses how operators can take a more holistic approach, from understanding site-specific hazards and selecting complementary technologies to optimising detector coverage and improving system visibility.

Below are excerpts from the interview:

What are some of the biggest fire and gas detection challenges facing oil and gas operators today?

One of the central challenges is balancing growing operational demands with the need to manage risk effectively.

Oil and gas operators need to understand where combustible or toxic gases, ignition sources, and other hazards may exist, while also considering how effectively a system can identify developing risks while minimising unnecessary nuisance alarms that may disrupt operations.

What should operators consider when developing or reviewing their overall fire and gas detection strategy?

By conducting an operational hazard assessment, operators can identify the highest risk areas in their operation.

Environmental conditions, maintenance accessibility, and operational activity should also form part of that assessment.

Since people, equipment, and processes move through different areas, the strategy should reflect potential exposure to both personnel and assets rather than looking at individual detectors in isolation.

At MSA, this application-led approach is an important part of working with operators and maintenance staff to identify suitable detection technologies for the challenges present at a particular facility.

Why is it important to use a combination of detection technologies rather than relying on a single approach?

No single detection principle is suited to every hazard, application, or environment.



General Monitors® FL5000 application at a refinery



Kevin Killeen

Different technologies have strengths depending on factors, such as the gas involved, the type of fire risk, location, and operating conditions.

This is why MSA creates layers of protection: Point gas detection may be used to identify a combustible gas release at a specific location, while open-path technology can provide detection across a wider area.

Ultrasonic gas leak detection can offer another layer by identifying the sound associated with a pressurised leak, while flame detection provides an additional means of identifying an event if ignition occurs.

MSA solutions, such as the ULTIMA® X5000 Gas Monitor, General Monitors® S5000 Gas Monitor, General Monitors® FL5000 and other detectors can form part of this broader approach, depending on the application and risk assessment.

How should operators determine which detection technology is most appropriate?

Technology selection should follow the hazard assessment rather than lead it.

Operators need to consider factors including the gases or hazards involved, environmental conditions, installation constraints, required response times, and maintenance requirements.

Working with detection specialists can help translate those factors into an appropriate combination of technologies.

The key is avoiding a one-size-fits-all approach and selecting technology around the specific risks and operating conditions of the facility.

How important are detector positioning and coverage, and what role can fire and gas mapping play?

Advanced detection technology can provide limited value if it is not positioned appropriately for the hazard it is intended to detect.

Engineering judgement and experience remain important, and modern fire and gas mapping can complement that expertise by using modelling and analysis to identify higher-risk areas and assess detector coverage.

This can support more informed decisions about where different technologies should be positioned.

What additional challenges do harsh oil and gas environments create?

Oil and gas equipment may need to operate in widely varying environmental conditions, from Arctic installations to offshore platforms exposed to salt spray or Middle Eastern facilities experiencing large temperature fluctuations.

Equipment selection, therefore, needs to consider the environment in which it will operate, alongside the relevant specifications and certifications.

Maintenance must also be considered.

Accessibility, changing conditions, and operational demands can all influence how detection equipment is inspected and managed throughout its service life.

MSA Safety works with customers in the product development stage to help design products that will perform and last in the toughest environments.

Where do you see the biggest opportunities for operators to improve safety, reliability and maintenance efficiency?

One of the biggest opportunities is greater visibility into the health and condition of detection equipment.

Advanced diagnostics and analytics can provide operators with more information about detector condition, helping to support maintenance and lifecycle decisions.

Continued developments in sensing and optical technologies are also important.

Digital connectivity is another key area. As facilities increasingly automate processes and manage growing operational demands, improving how devices communicate and share information can provide greater visibility across detection systems.

For MSA, the opportunity is developing individual detection technologies as well as supporting more connected strategies that help operators better understand both the risks across their facilities and the condition of the equipment used to manage them. ■

MSA Safety is exhibiting at Stand 8176, Hall 8.

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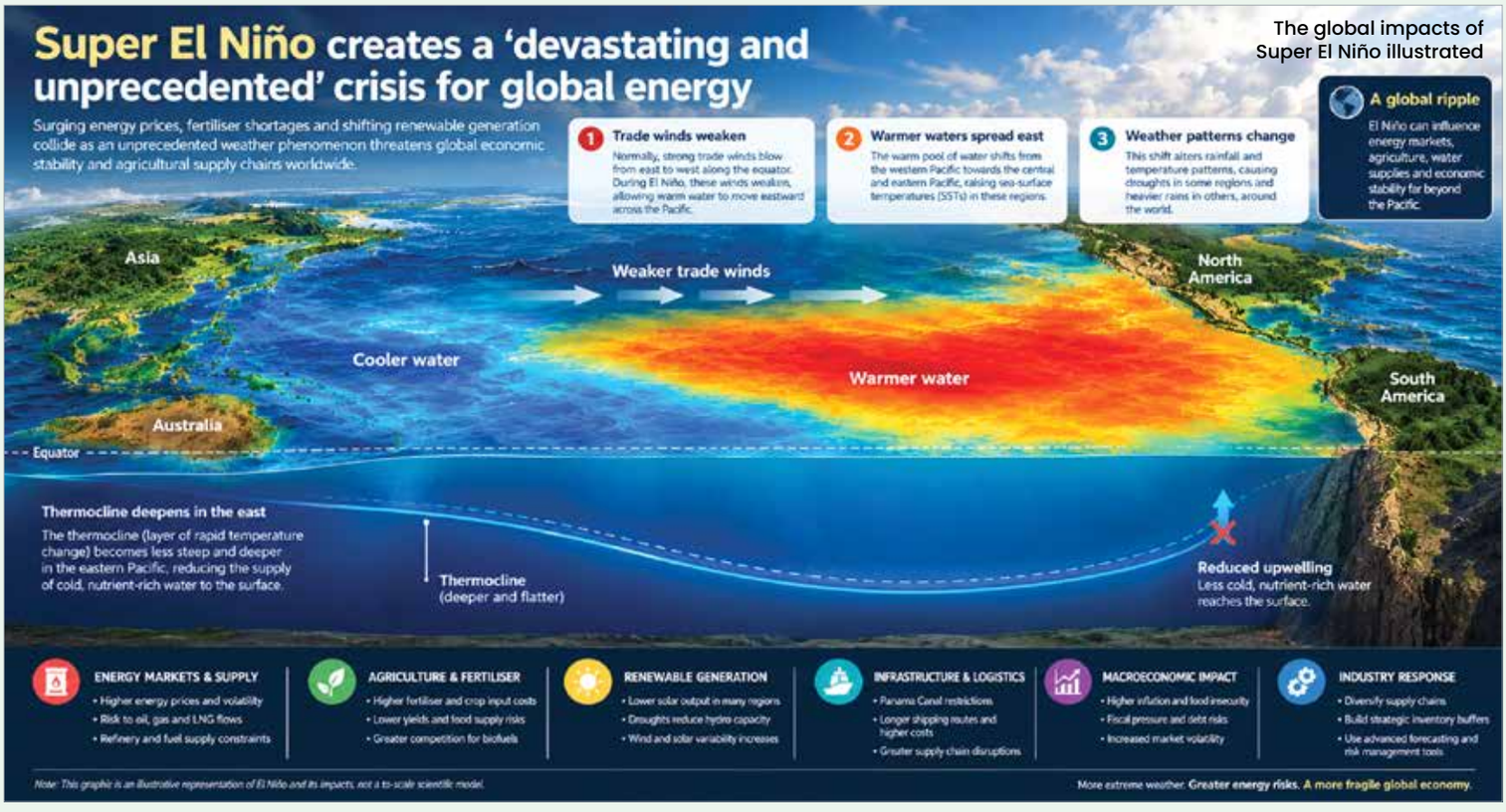


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Super El Niño creates a ‘devastating and unprecedented’ crisis for global energy

Surging energy prices, fertiliser shortages and shifting renewable generation collide as an unprecedented weather phenomenon threatens global economic stability and agricultural supply chains worldwide



BY ABDULAZIZ KHATTAK

AS a record-shattering weather pattern develops across the Pacific Ocean, energy markets face an unprecedented convergence of physical disruption and geopolitical shock.

An Associated Press report said that the 2026-2027 El Niño is projected to be the strongest event in the instrumental record, driving record global heat and severe environmental stress.

A seasonal forecast model reported in The Climate Brink puts the event’s peak at around 4.1 deg C in the Niño 3.4 region, which significantly eclipses the prior record set during the 2015-2016 event.

While mainstream meteorological commentary focuses primarily on rising temperatures, the true gravity of this phenomenon lies in its intersection with a fragile global energy landscape.

A Wood Mackenzie report said the onset of these severe conditions arrives just as the energy industry grapples with shifting power generation yields, volatile gas demands, and acute maritime bottlenecks.

This unfolding crisis is not merely a seasonal weather anomaly, but an environmental multiplier that directly threatens power grids, fuel supplies, and industrial operations across multiple continents.

The vulnerability of the modern energy system is heavily exposed by the simultaneous escalation of military conflict in the Middle East and maritime restrictions in critical trade corridors.

The ongoing Iran war and the effective disruption of transit through the Strait of Hormuz have severed critical flows of oil, liquefied natural gas (LNG), and vital fertiliser components.

The Strait of Hormuz carries crude oil equal to about 20 per cent of world supply and serves as the primary maritime outlet for LNG exports from Qatar and the UAE.

As these energy pathways face repeated restrictions, global gas markets have experienced sharp volatility, with European benchmark TTF gas trading up significantly since July.

This energy shock trickles directly down into the foundational economics of global agriculture, primarily through the production of chemical fertilisers.

Nitrogen fertilisers depend heavily on natural gas both as a chemical feedstock and as a direct fuel source for industrial manufacturing processes.

Gulf producers traditionally account for roughly 29 per cent of global urea trade, making regional geopolitical instability an immediate threat to international crop nutrition.

Furthermore, sulphur, which is a critical intermediate for phosphate fertilisers recovered from sour natural gas and crude oil, has faced extreme supply constraints.

An S&P Global report said about 47 per cent of global sulphur trade normally passes through the Strait of Hormuz, and benchmark prices surged to historic highs as exports dropped sharply year over year.

Phosphate producers in regions, such as Morocco, were consequently forced to scale back operating rates by up to 30 per cent to manage raw material scarcity.

Simultaneously, the loss of millions of barrels per day of tradeable diesel exports from the Middle East and Russia has severely squeezed farm operating margins worldwide.

Refinery constraints and export restrictions have driven the price spread between crude oil and diesel to unprecedented levels, forcing agricultural producers to ration fuel and essential nutrients.

POWER SYSTEMS & RENEWABLE GENERATION UNDER WEATHER STRESS

Weather-dependent energy assets face complex operational challenges as the super El Niño alters historical wind, solar, and hydrological baselines across key global markets.

El Niño conditions create mixed outcomes for renewable power generation, generally proving bearish for solar output across most of the world while causing localised disruptions.

In the US, historical patterns indicate that milder winter conditions in the northern regions reduce natural gas heating demand and place downward pressure on consumer energy prices.

However, severe droughts driven by El Niño can severely impair hydroelectric generation capacity, as witnessed during previous events in China, India, and Latin America.

Maritime logistics face compounding pressures as low water levels restrict transit through vital infrastructure like the Panama Canal.

During previous dry periods, the Panama Authority enforced strict draft limits on Neopanamax locks, forcing liquefied natural gas carriers heading for Asian markets to seek alternative routes around the Cape of

Good Hope.

These detours add weeks to transit times and keep global shipping and operational costs elevated for energy operators.

Despite these physical and logistical headwinds, some regional electricity markets demonstrate unexpected resilience against weather anomalies.

Research focused on Australia's main electricity market indicates that El Niño has a surprisingly neutral impact on the overall balance between electricity demand and utility-scale renewable generation.

The averaging out of geographic diversity across vast regional networks, combined with increased solar photovoltaic output during specific months, helps offset the spikes in air-conditioning demand.

Nevertheless, grid operators cannot rely on broad macro climate indicators to accurately forecast short-term wind speeds and solar radiation levels at turbine hub heights.

The energy sector's long-term operational security increasingly demands advanced predictive modelling tools that can translate broad macro-climatic phenomena into precise, asset-level meteorological forecasts.



El Niño could directly threatens power grids, fuel supplies, and industrial operations across multiple continents

MACROECONOMIC FALLOUT & INDUSTRIAL ADAPTATION

The confluence of extreme weather, high fertiliser costs, and constrained fuel supplies creates significant macroeconomic risks for governments and industrial players.

As agricultural input costs rise, farmers face difficult choices regarding whether to reduce fertiliser application rates or decrease planted acreage for staple crops such as corn, rice, and soybeans.

Rainfed grains and oilseeds in Brazil and Australia face the highest exposure to potential yield losses if El Niño-induced droughts materialise as projected.

Furthermore, high global energy prices have strengthened the commercial viability of biofuels, driving agricultural commodities like palm oil and rapeseed away from human food consumption and into industrial fuel tanks.

This fierce competition between food security and energy policy adds robust demand-side support to commodity markets that are already buckling under extreme supply-side pressures.

Central banks and fiscal authorities must navigate the complex inflationary second-round effects of rising food and energy prices acting simultaneously on consumer price indices.

Governments across developing nations are forced to allocate billions of dollars towards emergency food and fertiliser subsidies to prevent widespread social unrest.

These fiscal interventions strain national budgets and increase sovereign debt burdens in countries that possess the least economic resilience to external shocks.

Industrial operators across the oil, gas, and power sectors are actively revising their risk management frameworks to account for the growing frequency of synchronised global crises.

Energy executives can no longer treat meteorological forecasts and geopolitical conflicts as isolated operational variables.

Maintaining business continuity in an increasingly volatile world requires robust supply chain diversification, strategic inventory buffers, and proactive capital allocation.

The coming months will thoroughly test the resilience of global energy and agricultural infrastructure as the most powerful El Niño in recorded history reaches its peak. ■

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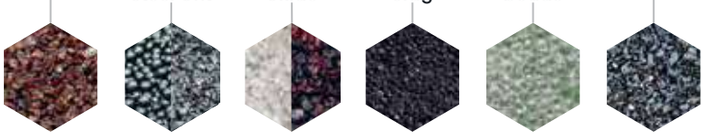




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Advanced tech eliminates pipeline inspection blind spots for operators

QUADRA brings complementary diagnostic technologies into a single inline inspection run to provide unprecedented clarity regarding complex interacting integrity threats, Miguel Maldonado tells *OGN*

BY ABDULAZIZ KHATTAK

PIPELINE operators globally are turning to advanced multi-technology inspection solutions to eliminate data blind spots, manage cumulative stress, and ensure long-term integrity across critical energy infrastructure.

Traditional single-technology tools often leave operators with fragmented diagnostic results, making it difficult to detect complex interacting threats or evaluate aging pipelines operating beyond their original design limits.

To address these challenges, NDT Global's QUADRA™ brings together circumferential magnetic flux leakage (CMFL), axial MFL (AMFL), caliper (CAL), and low field inspection (LFI) technologies in a single inline inspection run.

By integrating complementary ultra-high resolution datasets aligned to a single odometer stream, the platform enables analysts to evaluate seam-related features, localised pitting corrosion, and mechanical deformation simultaneously within a single integrity framework.

In an exclusive interview with ***OGN*** energy magazine, Miguel Maldonado, Director, MFL Product Management, NDT Global, says: "Repurposing existing pipelines for CO2 and hydrogen service requires a thorough understanding of both asset condition and material characteristics."

He stresses that connecting inspection data with advanced analysis and integrity engineering allows operators to move beyond raw figures toward clear, risk-based decisions that support life extension and decarbonisation goals.

Below are excerpts from the interview:

How does the multi-technology architecture of QUADRA™ eliminate the data blind spots and physical limitations inherent in traditional single-technology inline inspection tools?

Traditional inline inspection technologies are highly effective for specific threat types but typically have inherent limitations.

QUADRA™ addresses this challenge by combining complementary technologies, including CMFL, AMFL, CAL, and LFI, into a single inspection platform.

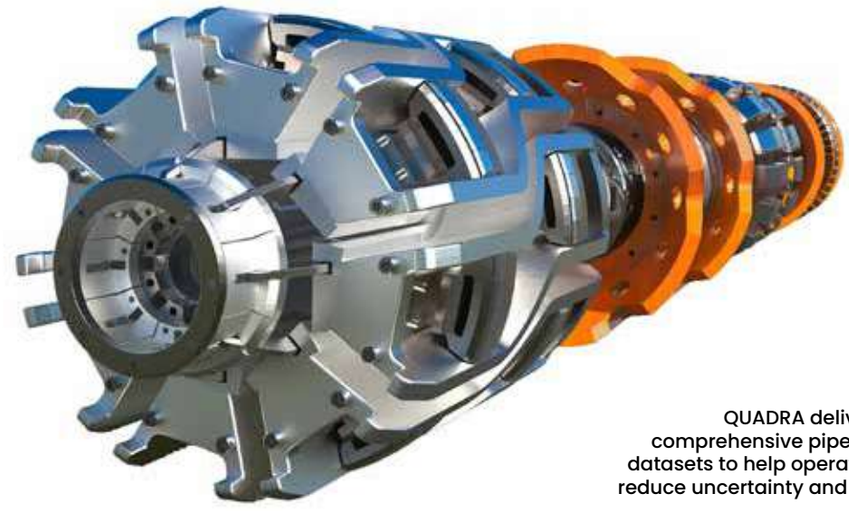
For example, while AMFL is highly effective for detecting metal loss, long axially oriented anomalies can be challenging for this technology alone.

CMFL complements this capability by enhancing the detection and characterisation of axially oriented features and seam-related threats.

Combined with CAL and LFI, operators gain a more complete understanding of pipeline condition, including metal loss, deformation, material properties, hard spots, and narrow linear indications.

By integrating multiple ultra-high resolution (UHR) datasets into a single inspection run, QUADRA™ minimises blind spots, reduces uncertainty, and provides a more comprehensive assessment of pipeline integrity.

How does your combined axial and circumferential magnetic flux leakage technology resolve complex interacting anomalies, such as seam-weld defects occurring alongside localised pitting corrosion?



QUADRA delivers comprehensive pipeline datasets to help operators reduce uncertainty and risk



The QUADRA's front face

Because QUADRA™ collects both AMFL and CMFL data in a single inspection run, all indications are aligned to the same odometer stream.

This allows our analysts to evaluate seam-related features and localised corrosion together, using complementary datasets to better characterise complex interacting anomalies and reduce uncertainty in the final assessment.

With pipeline operators increasingly running legacy infrastructure well beyond original design limits, how does your technology quantify cumulative stress and micro-cracking to satisfy rigorous regulatory audits?

For aging pipeline assets, the key challenge is obtaining the most complete and reliable understanding of the current asset condition.

This can often be best achieved by combining multiple inspection technologies to help detect and characterise cracking and other threats.

QUADRA™ delivers a comprehensive dataset by combining CMFL, AMFL, CAL, and LFI technologies in a single inspection run, enabling the identification and characterisation of a broad range of integrity threats.

This multi-technology approach provides valuable insights into metal loss, seam-related threats, mechanical damage, deformation, material properties, and hard spots, helping operators reduce uncertainty and make informed integrity management decisions.

By improving confidence in asset condition assessments, operators are better positioned to support fitness-for-service evaluations, risk management programmes, and regulatory compliance requirements.

How do your multi-technology inspection tools withstand the extreme operating conditions of the GCC, specifically high ambient temperatures, severe sand erosion, and highly corrosive sour gas (H2S) environments?

By considering the tough operating conditions, our tools are designed to succeed where others may not.

Reliability in challenging operating environments begins with engineering and design.

From the outset, many of our inspection technologies are developed with demanding pipeline conditions in mind, enabling them to operate effectively across a wide range of environments, including those commonly found throughout the GCC region.

That said, no inspection technology is immune to every operational challenge. Success depends not only on robust tool design but also on effective project planning.

Our project management and engineering teams work closely with operators to understand pipeline conditions, assess risk, and define execution strategies that maximise inspection effectiveness while minimising operational uncertainty.

What technical breakthroughs in subsea robotics now enable the reliable inspection of deep-

water and unpiggable pipeline geometries previously considered impossible to assess?

The main technical breakthrough for subsea robotics is modularity.

At NDT Global, we have expertise in many different sensor technologies, allowing us to select the most appropriate methodology depending on the application.

We have purposefully designed a modular tractor system that we can equip with a variety of non-destructive technologies, depending on the configuration of the pipe, the material, and, most importantly, the expected damage mechanism.

We have a plethora of UT sensors, used for liquid corrosion and crack detection, electromagnetic methods for surface crack evaluation and laser profilometry equipment for ovality and geometry measurements.

Having this flexibility is a key component for addressing non-standard ILI projects.

As pipeline data volumes grow exponentially, how is NDT Global applying advanced analytics and data fusion to prevent operators from drowning in raw figures without clear actionable intelligence?

Our focus is on combining high-quality inspection data, advanced analytical capabilities, and experienced technical expertise to transform complex datasets into meaningful insights that operators can act upon.

Data fusion plays an important role in this process, enabling information from multiple inspection technologies to be integrated and interpreted within a single integrity framework.

By bringing together the right technology, the right data, and the right people, we help customers move beyond raw information and toward clear, risk-based decisions that support safe and efficient pipeline operations.

Considering tightening regional regulations across the Middle East, how are your diagnostic datasets enabling operators to shift from reactive remediation schedules to predictive asset management?

Predictive asset management starts with high-quality data. By combining AMFL and CMFL datasets in a single run, operators gain greater confidence in threat identification and characterisation.

These insights can then be integrated into integrity management programmes to support corrosion growth assessments, prioritise maintenance activities, and enable more proactive, risk-based asset management decisions.

With GCC national oil companies heavily investing in regional carbon capture hubs and blue hydrogen networks, how are you supporting regional operators in certifying legacy pipelines for high-pressure carbon dioxide and hydrogen transportation?

Repurposing existing pipelines for CO_2 and hydrogen service requires a thorough understanding of both asset condition and material characteristics.

QUADRA™ supports this process by providing high-confidence inspection data on metal loss, deformation, material properties, pipe grade variations, and hard spots, all within a single inspection run.

This information helps operators validate historical records, assess pipeline suitability for future service conditions, and make informed integrity management decisions.

In particular, hard spot identification and material verification capabilities can provide important insights when evaluating assets for hydrogen transportation applications, where material performance is a critical consideration.

Where do you see the primary capital expenditure priorities for pipeline operators shifting over the next five years between immediate maintenance and long-term decarbonisation readiness?

Operators are under pressure to maintain aging infrastructure today while preparing assets for tomorrow's energy transition.

QUADRA™ helps support both objectives by combining CMFL, AMFL, CAL, and LFI technologies in a single inspection run, delivering a more comprehensive understanding of pipeline condition.

By reducing uncertainty and improving threat characterisation, operators can prioritise remediation more effectively.

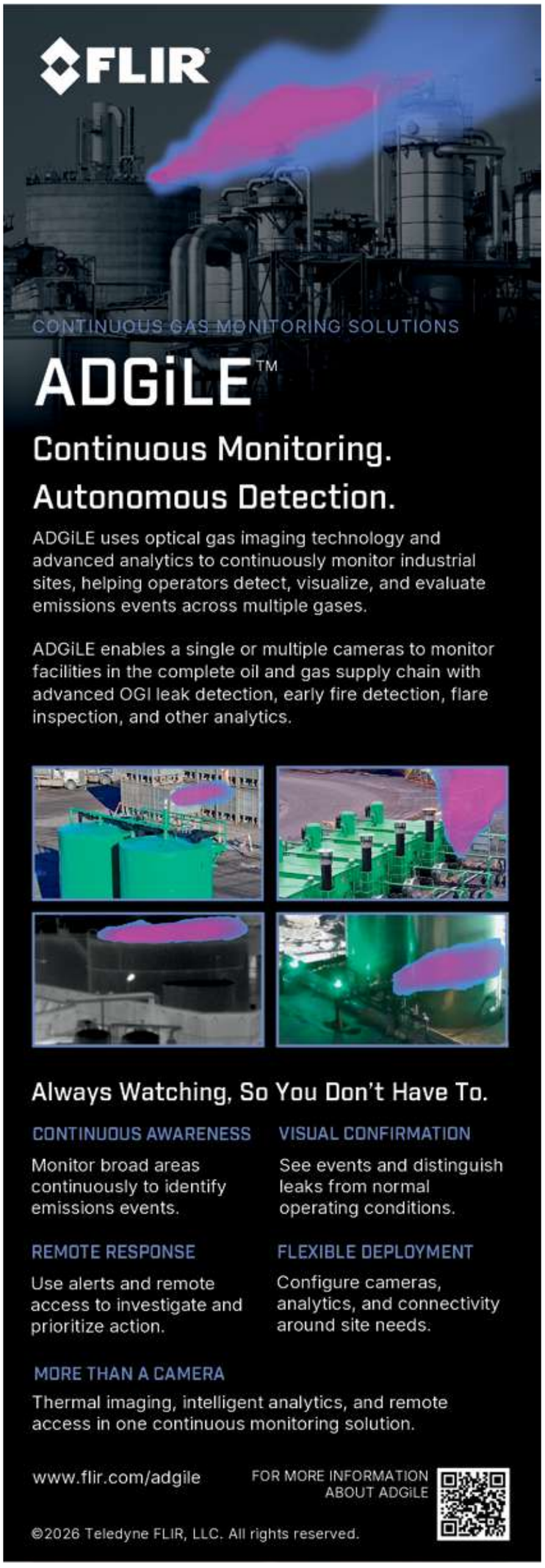
In an environment of constrained budgets and evolving asset requirements, better asset intelligence helps ensure investment is directed where it delivers the greatest value.

From a strategic leadership perspective, how is NDT Global positioning its service portfolio to remain indispensable as global energy markets balance fossil fuel asset optimisation with the net-zero transition?

We're focused on helping operators maximise the value of existing assets while preparing for the needs of the future.

NDT Global is continually investing in advanced inspection technologies, data analytics, and integrity solutions that provide a deeper understanding of asset condition and risk.

Solutions like QUADRA™ deliver more comprehensive integrity insights today, while our ongoing innovation is aimed at addressing emerging challenges such as asset life extension, repurposing for new energy applications, and supporting the industry's transition toward a lower-carbon future. ■



Driving global circular economy through strategic waste management action

Implementing country programmes and market-driven thematic initiatives accelerates systemic transformation, mobilises institutional capital, and scales vital plastic waste management infrastructure worldwide



Credit: Fatima Yusuf

The global generation of plastic waste has grown more than seven-fold in the last four decades to reach approximately 360 million tonnes a year

BY ABDULAZIZ KHATTAK

IN 2025, the Alliance to End Plastic Waste (AEPW) claimed to have reduced 138,162 tonnes of unmanaged plastic waste and valorised 165,317 tonnes, bringing cumulative totals since inception to 378,147 tonnes reduced and 418,529 tonnes valorised, alongside generating $641 million in funding commitments from third parties and impact investors since 2019.

Beyond the metrics, education and behaviour-change initiatives reached over 1.5 million people since inception, while 559 organisations were engaged in 2025 to finance, develop, and implement projects.

As noted by Jacob Duer, President and CEO, AEPW, addressing the challenge of plastic waste and plastic circularity is a multi-faceted issue that requires deep knowledge and sensitivity to socioeconomic, geopolitical, and cross-cultural considerations.

Economic volatility and geopolitical uncertainty continue to provide strong headwinds, slowing investment cycles and increasing risk sensitivity across the value chain, while global generation of plastic waste reaches approximately 360 million tonnes a year, a figure that has grown more than seven-fold in the last four decades.

Despite these headwinds, the organisation has shifted decisively from smaller, standalone projects to large-scale, integrated programmes focused on systems change in a select number of countries and thematic areas.

Through rigorous impact measurement, cumulative achievements since inception in 2019 include allocating $583 million of catalysed funding to mission-related activities, collecting a total member revenue of $509 million, and allocating $314 million directly to mission-related activities.

Furthermore, cumulative metrics show that the organisation has reached 1,509,498 participants through education programme.

During the single reporting period for 2025, the organisation installed 31,815 tonnes per year of technical capacity to collect and properly manage mixed solid waste, and secured total funding commitments of $100 million along side $58 million in total funding allocated.

REGIONAL IMPLEMENTATION OF INTEGRATED COUNTRY PROGRAMMES

Under Strategy 2030, AEPW has established country programmes in Brazil, the GCC beginning with Saudi Arabia, India, Indonesia, and South Africa, working in collaboration with national governments and development finance institutions with, at least, $100 million in co-financing for each territory to address both national and systemic barriers and support long-term sustainability.

In Brazil, which is the world's fourth largest producer of plastic waste and Latin America's most prominent producer of plastic resins, over 70 per cent of solid waste generated ends up in sanitary landfills, compared to Europe where the figure is 22 per cent.

Indonesia produces 32 million tonnes of unmanaged plastic waste, making it the second-largest contributor of mismanaged plastic waste globally.

The alliance's strategy in Indonesia involves scaling proven solutions through coordinated interventions across the waste management system in partnership with AAIB's solid waste management for sustainable urban development (SWM-SUD) project through loans with $150 million across more than 10 cities and districts.

In 2025, the Asian Infrastructure Investment Bank (AIIB) commissioned a mini Material Recovery Facility (MRF) in March 2026 as part of a 12-village pilot, to be incorporated into multiple project cities and regencies. It also committed up to $40 million for principles from the Malang Regency pilot.

In South Africa, where municipal systems are fragmented and capacity-constrained, strategy moves beyond pilots toward system-level implementation through projects such as the African Reclaimers Organisation, Green Corridors, and Eco Renew.

Having signed memorandums of understanding (MoU) with the Department of Forestry, Fisheries and the Environment and the Development Bank of

Southern Africa, the organisation started a feasibility study in 2025 for an anchor project to develop integrated municipal-level solid waste management systems across six cities.

Meanwhile the African Reclaimers Organisation Phase III has advanced into detailed planning and Eco Renew concluded the first phase of expanding its facility to meet demand for recycled low-density polyethylene pellets.

ADVANCING THEMATIC CIRCULAR SYSTEMS & FLEXIBLE PLASTICS

AEPW's first Thematic Programme focuses on advancing circularity for flexible plastics, which are among the most widely used yet hardest-to-recycle materials due to their lightweight nature, diverse material compositions, and frequent use of multi-layer structures.

Technical solutions alone are insufficient for flexible plastics, as long-term success depends on creating economically viable recycling systems that can consistently produce high-quality recyclates with reliable end-markets.

This is underpinned by a market-driven strategy that ensures recyclate outputs meet end-market requirements before investments are made in infrastructure and technology.

Europe and North America serve as the initial focus of the Flexibles Thematic Programme, reflecting their more advanced development of required key conditions.

In the US, a study of recycled plastics from commercial and industrial sources has been commissioned to identify and quantify end-use applications, while in Phoenix, Arizona, support for RME Defeats Waste introduces on-site material baling and on-demand collection to help low-volume commercial waste generators recycle flexible plastics.

The RME Defeats Waste project has enabled a food manufacturing site to recover more than four tonnes of flexible plastic waste within three months and aims to deploy 35 mini balers across Metro Phoenix.

In Europe, work continues with London-based Nextek supporting COtooCLEAN technology, which uses supercritical carbon dioxide to remove contaminants from post-consumer flexible plastic films to enable recycling into high-quality, food-grade packaging applications.

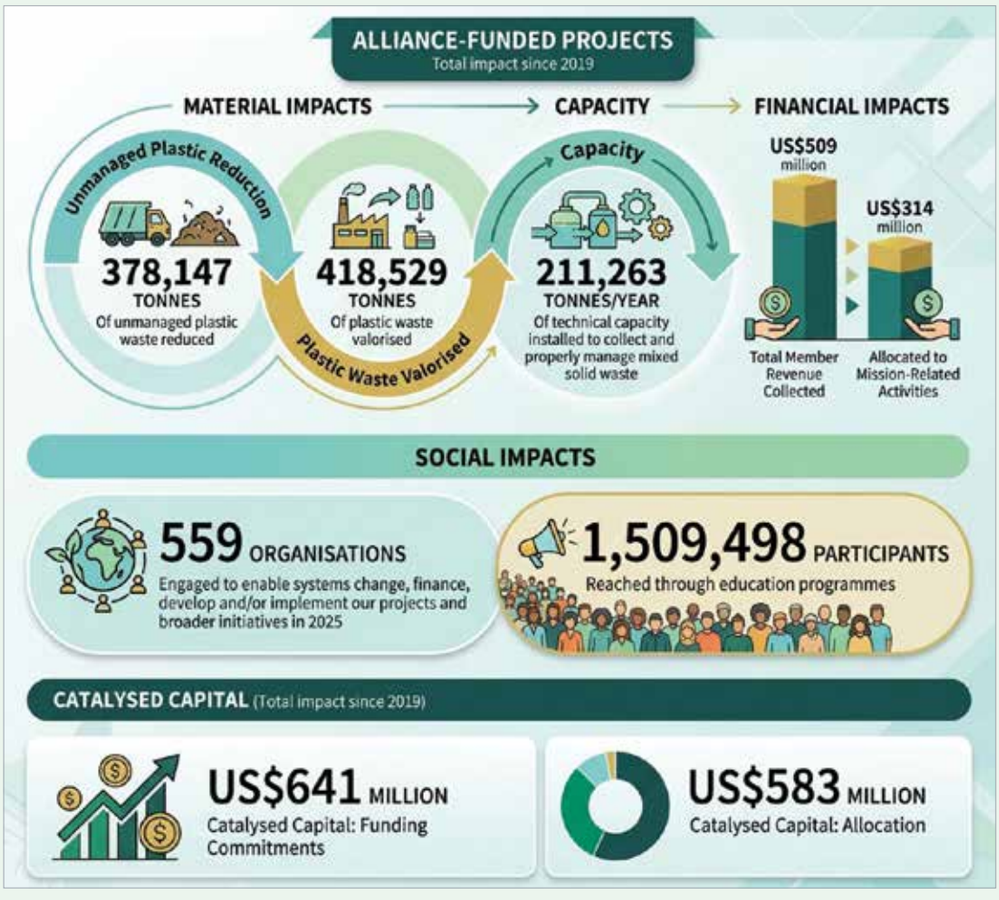
Furthermore, the organisation advanced HolyGrail 2.0, driven by the AIM-European Brands Association, to prove the commercial viability of digital watermarks for accurate sorting of packaging waste.

This helped achieve industrial-scale plastic detection efficiency rates between 87.9 per cent and 93.8 per cent averaging 56,000 detections per day across 5,949 unique SKUs over a 100-day period.

The subsequent stage, HolyGrail 2030-Circular Packaging, shifts to market adoption programmes with early-adopter market demonstrations launched in Belgium for flexible polypropylene food packaging and Germany for rigid polypropylene food packaging, alongside a study on future infrastructure needs for flexibles collection and recycling building upon insights from the Circular Economy for Flexible Packaging in the EU.

Case studies in the technology portfolio further demonstrate progress. These include Fych Technologies in Spain, which developed patented processes for delaminating multi-layer plastics to eliminate internal inks and adhesives without degradation and using pure steam to eliminate volatile organic compounds (VOCs), semi-volatile compounds, and unwanted odours operating on a renewable energy framework at less than half the carbon footprint of virgin plastic production and heavy chemical recycling methods.

Additionally, Swiss company Bloom Biorenewables converts non-edible biomass into bio-based chemicals and materials through a chemical fractionation process, closing a Series A financing round of $15 million in April 2025 with participation from the Lombard Odier Investment Managers Plastic Circularity Strategy fund.



AEPW's funded projects and their total impact since 2019

MOBILISING CAPITAL & UNLOCKING INSTITUTIONAL INVESTMENT

Mobilising capital remains one of the most significant challenges in advancing a circular economy for plastics at scale, particularly in emerging markets where waste management infrastructure remains underdeveloped and projects face financing hurdles due to perceived risk, limited track records, fragmented value chains, and uncertain revenue streams.

The organisation addresses this challenge by supporting financing approaches that mobilise capital at scale, collaborating with financing institutions to co-design financing mechanisms, and contributing technical expertise, concessional capital, and access to grant funding to help de-risk projects and reduce the overall cost of capital.

A key milestone includes participation in the Green Investments Partnership, a blended finance programme established under the Singapore Government's Financing Asia's Transition Partnership initiative and managed by Pentagreen Capital.

The initiative provides technical expertise in assessing recycling technologies, which increased its committed capital at second close with participation from public, private, and philanthropic providers including DBS and Cathay United Bank.

The organisation has continued its involvement in the Plastic Circularity Strategy fund co-designed and seeded with Lombard Odier Investment Managers.

The fund deploys growth equity capital into core impact propositions and recently reached its final close, alongside conceptual design work for a plastic waste outcome-based financing facility focused on Africa with a large commercial bank and an Asia Pacific-focussed facility.

Exploratory discussions are also underway with multilateral development banks regarding a potential financing facility focused on waste recycling across South and Southeast Asia.

Particular attention is paid to countries experiencing high levels of plastic leakage into the environment such as India, Indonesia, Vietnam, and Thailand.

Experience across blended finance programmes, private-sector investment vehicles, and development finance partnerships indicates that attracting capital requires investable project pipelines, financing structures that appropriately allocate risk, pooled capital vehicles with risk-sharing features, clear pathways to profitability within three to five-year investment timeframes, and access to continuous financing over seven to 15-year periods.

Demand-side signals, such as multi-year offtake agreements from end-market users and policy interventions like Extended Producer Responsibility schemes further strengthen project bankability and long-term economic viability.

Operational resilience is reinforced by interventions, such as bridging critical financing gaps through restructuring strategies, exemplified by issuing a Convertible Loan Note facility in 2025 to provide immediate liquidity and working capital support for an African recycling business facing operational continuity risks.

Sustained progress toward global plastic circularity depends on scaling integrated country programs, unlocking flexible plastic markets, and catalysing institutional investment to build resilient, long-term waste management infrastructure worldwide. ■

Optimising waste-heat conversion using precise moisture sensors

Precision sensor integration protects critical hydrogen infrastructure while enabling closed-loop waste-heat power generation in demanding industrial environments across research and deployment

As energy technology firm JTEC Energy prepares its novel hydrogen-based waste-heat-to-power conversion system for commercial field deployment, precise moisture measurement has emerged as a cornerstone of operational integrity.

The technology converts waste heat into electrical power at higher efficiencies and lower temperatures than competing approaches by using hydrogen as a working fluid.

The architecture pairs a heat-driven compression process with electrochemical stacks that convert hydrogen pressure into electrical potential.

In this closed-loop process, a single charge of hydrogen circulates continuously without being consumed, making waste heat the sole operational fuel input.

However, the system unites two distinct subsystems with opposing humidity demands: an electrochemical stack that requires humidified hydrogen to maintain optimal membrane function, and metal hydride reactors that suffer severe degradation when exposed to excessive moisture.

To bridge these conflicting requirements, JTEC designed a closed-loop gas management system engineered to remove and recirculate more than 99.99 per cent of introduced moisture.

Achieving operational stability across dynamic batch processes, where pressure, temperature, and flow fluctuate significantly through cycles, requires industrial-grade sensors capable of operating in hydrogen, supporting variable flow, integrating into control systems, and meeting hazardous area specifications.



Vaisala dew point transmitter DMT143



Vaisala DMP370 safe dew point instrument with DMP374 for pressurised_processes

OPERATIONAL CHALLENGES & SENSOR STANDARDISATION

Prior to standardising instrumentation, JTEC utilised conventional relative humidity and dew point sensors during research and development.

These traditional instruments lacked sufficient robustness, particularly during condensation or saturation events.

A saturated probe could force engineers to halt testing, dry down equipment, clean the process loop, and restart experiments.

In one instance, sensor saturation forced an engineer to spend three days attempting to complete a six-hour test.

In commercial production units, where the waste-heat conversion subsystem accounts for more than a third of total system cost, such measurement failures carry severe economic consequences.

Excess moisture exposure leads to oxide layer formation on metal hydrides, limiting hydrogen absorption, reducing reactor performance, and forcing offline maintenance downtime.

To eliminate these risks, JTEC piloted Vaisala dew point instrumentation in 2023 before standardising the technology across both research operations and production system architectures.

The hardware selection was driven by low dew point performance, calibration stability, component availability, integration flexibility, and specialised technical support.

In the production architecture, three specific sensors manage moisture control points.

First, a Vaisala HMP7 relative humidity and temperature probe evaluates gas exiting the electrochemical stack after initial dehumidification to confirm system performance and prevent line condensation.

Second, an Ex-rated Vaisala DMP370 sensor monitors low dew point levels following final moisture removal stages, verifying that hydrogen is dried back to exact specification prior to re-entering the metal hydride reactors.

Third, a Vaisala DMT143 dew point transmitter operates within the maintenance manifold, which adjusts gas pressures during startup, shutdown, and maintenance to ensure moisture is not transferred from wet sections into dry hydrogen supply lines.

TECHNICAL COLLABORATION & SYSTEM SCALING

Integrating these sensors involved embedding the hardware directly into larger system assemblies and linking them to central control logic.

For low dew point tracking, the Vaisala DMP370 provides continuous, stable readings without calibration interruptions, allowing operators to determine exact switching intervals between dehumidification columns.

Automatic calibration functionality increases measurement confidence, whilst embedded pressure compensation routines ensure accurate readings despite fluctuating operating conditions.

Because humidity measurement in hydrogen at non-atmospheric pressures represents an evolving area of scientific study, JTEC relied on technical guidance from Vaisala's doctoral-level metrology experts to establish sound pressure compensation models and define measurement certainty limits.

Standardising on Vaisala DMT143, HMP7, and DMP370 sensors has provided JTEC with a uniform technology suite across both R&D operations and commercial production units.

Real-time data visibility allows the system to validate moisture removal performance across the entire gas management loop, protecting reactor investments and maintaining continuous power production.

As JTEC advances its first production units toward field pilot deployment and prepares for future scaling, robust moisture measurement remains vital to confirming operational reliability, supporting hazardous-area compliance, and building market trust in closed-loop waste-heat recovery. ■





Vaisala relative humidity and temperature probe HMP7

Innovative tether-severing techniques delivered safe, fast-track execution while lowering operational costs and proving long-term asset durability, Gerardo Rodriguez, tells *OGN*

CoreMarine completes complex FLNG disconnection for Argentina project

BY ABDULAZIZ KHATTAK

COREMARINE has executed a novel full-load tether-severing methodology to disconnect the Hilli Episeyo floating liquefied natural gas (FLNG) vessel offshore Cameroon, safely releasing the asset after eight years of continuous production.

The fast-track engineering campaign enables the vessel's redeployment to Argentina's Golfo San Matías by mid-2027, where it will underpin the nation's emerging natural gas export infrastructure following shipyard upgrades in Singapore.

By severing the soft-yoke mooring tethers under full load rather than deballasting and reversing the original hookup, CoreMarine eliminated extensive subsea intervention, drastically reducing vessel spread requirements, deck equipment, and offshore execution time.

Post-disconnect inspections of the subsea architecture revealed minimal biofouling and material degradation, yielding critical empirical data that validates long-term integrity management frameworks for aging floating gas infrastructure operating in harsh tropical marine environments.

Following this operational milestone, CoreMarine secured the full transport, installation, soft-yoke mooring, and hook-up contracts for both the Hilli Episeyo and the MKII FLNG vessels in South America.

In an exclusive interview with ***OGN*** energy magazine, Gerardo Rodriguez, Lead Project Manager of CoreMarine, says: "The technical complexity and fast-track nature of this project highlight Coremarine's engineering expertise and our ability to deliver demanding offshore solutions within tight timeframes."



CoreMarine and Golar LNG teams after the successful completion of the Hilli Episeyo project

Below are excerpts from the interview:

How did CoreMarine's novel disconnection methodology specifically mitigate the engineering risks associated with releasing a soft-yoke mooring system submerged in tropical waters for eight years?

CoreMarine developed a disconnection methodology that avoided deballasting the soft yoke and reversing the original hookup.

Instead, the mooring tethers were severed under full load.

This significantly reduced the diving intervention required, allowing for a smaller diving spread and less demanding diving vessel requirements.

It also reduced the station-keeping requirements for the supporting tugs, shortened the time required to release the FLNG and reduced the amount of deck equipment needed offshore.

The main challenge was proving that the tethers could be safely severed under full load and that the resulting load transfer and system response remained within the required limits.

Significant engineering analysis and verification was undertaken to demonstrate this.

The result was a simpler and more cost-efficient offshore operation, reducing the overall spread, interfaces and execution time while maintaining the required level of safety and technical assurance.

How do the subsea biofouling and material degradation levels observed during the Cameroon disconnection inform long-term integrity management for floating gas infrastructure?

The inspection of the subsea components after approximately eight years offshore Cameroon showed relatively low levels of biofouling and material degradation.

This provided a positive indication of the condition and durability of the subsea systems over an extended period of operation in a tropical marine environment.

The findings reinforce the value of regular inspection and condition-based integrity management, while also providing useful real-world data to support the assessment of component life and maintenance requirements for floating gas infrastructure.

What primary structural modifications and system overhauls will be undertaken during the Singapore shipyard drydock phase to prepare the Hilli Episeyo for South American offshore conditions?

These modifications are being undertaken by Golar but will include adjustments to meet the new mooring systems and riser configuration

What critical metocean and geotechnical contrasts between offshore Cameroon and Argentina's Golfo San Matías must be accounted for during the soft-yoke reinstallation phases?

We will be installing a new APL subsea yoke system specifically designed for the new site geotechnical and metocean conditions.

How will CoreMarine manage the simultaneous offshore campaign requirements and supply chain constraints of hooking up both the Hilli Episeyo and the MKII FLNG vessels in an emerging region?

The installations are planned one year apart to avoid any clashes and leverage learnings from the first project. We will be using the same subcontractors and equipment where possible to leverage supply chain synergies.

What key technical lessons from the Cameroon project management framework are being embedded directly into the forthcoming transport and installation scope in Argentina?

The Cameroon campaign provided useful lessons for the Argentina project, particularly around interface management, engineering readiness, offshore sequencing, and procurement/logistics.

The experience also highlighted the value of completing engineering and equipment-readiness checks well ahead of the offshore campaign, even on fast-track projects like this one. This allowed issues to be identified and resolved before mobilisation rather than during the offshore operation, where they are usually more costly. ■



The FLNG vessel offshore Cameroon was safely released after eight years of continuous production

Energy security takes centre stage as WPC sets historic attendance records

Ministers and executives at the global congress warn that accelerating the energy transition without securing sustained upstream capital risks severe market destabilisation and widespread economic fallout



Prince Abdulaziz bin Salman



Amin Nasser

BY ABDULAZIZ KHATTAK

THE 25th World Petroleum Congress (WPC) in Riyadh closed its doors having attracted over 33,000 delegates from 135 countries, establishing a new attendance benchmark in the 93-year history of the event.

Themed "Pathways to an Energy Future for All", the event was hosted in Saudi Arabia for the first time in the Congress's 93-year history, from October 12-15, at the Riyadh Front Exhibition and Conference Centre.

It coincided with the 17th Clean Energy Ministerial (CEM17) and the 11th Mission Innovation Ministerial (MI-11).

Yet beneath the record-breaking scale and the ceremonial pageantry lies a more pressing industrial reality.

Energy ministers, sovereign wealth leaders, and supermajor executives convening in the Saudi capital delivered a unified warning: Global energy security remains dangerously fragile, and transition ambitions risk stalling entirely unless the international community commits to robust, sustained upstream capital expenditure.

Speaking during a high-level ministerial dialogue on global oil and gas markets, Prince Abdulaziz bin Salman, Saudi Arabia's Energy Minister, underscored the importance of strengthening energy resilience and maintaining flexibility in responding to market disruptions.

"The essence of how to attend to the crisis is that you have to focus on your resilience and creating options," he said.

Amid shifting geopolitical currents and surging power demands driven by artificial intelligence, the overarching narrative in Riyadh was not merely about managing the energy transition, but about engineering systemic resilience long before the next major disruption materialises.

ENGINEERING RESILIENCE AGAINST STRUCTURAL DISRUPTION

The strategic tone for the congress was set during the opening addresses, where senior executives emphasised that operational security cannot be improvised during a crisis.

Delivering the opening keynote, Amin Nasser, President and CEO of Aramco, emphasised that resilient energy systems must be developed well before market disruptions occur.

"Resilience that is designed, engineered, and built long before a crisis is therefore crucial," he said.

He highlighted Aramco's investments in infrastructure, spare production capacity, alternative export routes, cybersecurity and operational flexibility as essential components of long-term supply security.

Nasser also said Aramco was studying additional crude oil export routes and expanding overseas storage capabilities in coordination with the Ministry of Energy.

"This crisis reinforces the need for practical, resilient pathways," he added.

He further highlighted Aramco's plans to increase sales-gas production capacity by approximately 80 per cent by 2030 compared with 2021 production levels, alongside Saudi Arabia's continued development of renewable energy.

This aggressive capacity expansion reflects a broader industry recognition that natural gas and traditional hydrocarbons will continue to underpin baseload reliability as intermittent renewable generation scales up.

Concurrently, the Public Investment Fund (PIF) and its portfolio companies are steering capital into over 30 gigawatts (GW) of renewable projects currently under operation or construction, demonstrating a dual-track strategy that pairs hydrocarbon security with aggressive green infrastructure deployment.

CROSS-BORDER CORRIDORS & THE GRID-INTELLIGENCE CRUNCH

Beyond traditional upstream production, discussions in Riyadh pivoted sharply toward the physical constraints governing modern energy systems, particularly the collision between power grid capacities and soaring artificial intelligence data centre requirements.

In the "Energy and AI as Co-Enablers" session, speakers explored the growing interdepen-









The WPC opening



The WPC host handover to Kazakhstan

dence between energy systems and artificial intelligence (AI).

Mazin Albahkali, CEO, Principal Buyer, said: "Energy infrastructure and data centres cannot move forward independently of one another."

Dr. Margarete Schramboeck, former Minister of Economy and Digital Affairs of Austria and Board Member of Aramco Digital, noted: "The energy sector also needs artificial intelligence."

This interdependence is forcing a re-evaluation of regional power pooling and transmission architecture.

A prime example of this infrastructural evolution was the signed agreement between ACWA Power and Mongolia's Sun Steppe Power, which establishes a framework to explore a massive 4.5-GW cross-border renewable energy project supported by 500 megawatt-hours (MWh) of battery storage for export markets.

Similar integration efforts are taking root closer to the host nation, where progress on the Arab Common Electricity Market pilot project involving Saudi Arabia, Egypt, and Jordan highlights how regional grid interconnection is transitioning from policy dialogue into tangible cross-border asset development.

CAPITAL REALITIES THE DOWNSTREAM DECARBONISATION IMPERATIVE

This intricate balancing act between expanding supply and curbing emissions dominated technical and ministerial sessions alike, particularly within the downstream petroleum sector.

Pedro Miras, President of WPC Energy, reinforced the importance of sustained investment in securing the global energy future.

"There can be no successful energy transition without energy security, and no lasting energy security without sufficient, sustained investment across the energy system," he said.

Participating virtually, US Secretary of Energy Chris Wright emphasised the strategic importance of reliable energy supplies.

"Energy security is both economic security and national security," he said.

Mohamed Arkab, Algeria's Minister of State and Minister of Hydrocarbons, added: "Energy security starts with investment, and if there is no investment, then there would be a problem."

Meanwhile, Haitham Al Ghais, Secretary General of OPEC, highlighted Saudi Arabia's contribution to global energy security, describing the Kingdom as an example of providing an "insurance policy for energy security".

During the Organisation of Arab Petroleum Exporting Countries (OAPEC) symposium held alongside the main congress, Secretary General Khalid Al-Otaibi emphasised that downstream industries remain vital for industrial competitiveness and economic value creation across Arab economies.

Saudi Night

Achieving this growth while meeting stringent environmental targets requires deploying advanced carbon capture, utilisation, and storage systems alongside artificial intelligence optimisation tools, as highlighted by Khalid Al-Mehaid, Saudi Arabia's deputy minister of energy for sustainability and climate change.

Ministerial dialogues reinforced that these technological fixes rely entirely on consistent financial backing, ensuring that the industry leaves Riyadh facing a clear mandate to bridge the gap between transition rhetoric and physical execution through immediate capital deployment, robust cross-border cooperation, and uncompromising infrastructural foresight.

Beyond the conference programme, the 'Saudi Night' welcomed international delegates to the Saudi Pavilion at Boulevard World, offering an immersive introduction to the Kingdom's cultural heritage.

Five regional zones showcased traditional performances, crafts, workshops and regional cuisine, celebrating Saudi Arabia's cultural diversity and hospitality.

NEXT STOP FOR WPC: ASTANA

As the congress concluded, the formal handover established that Astana, Kazakhstan will host the 26th WPC Energy Congress from June 11 to 15, 2028, marking the first time the event will be held in Central Asia. ■







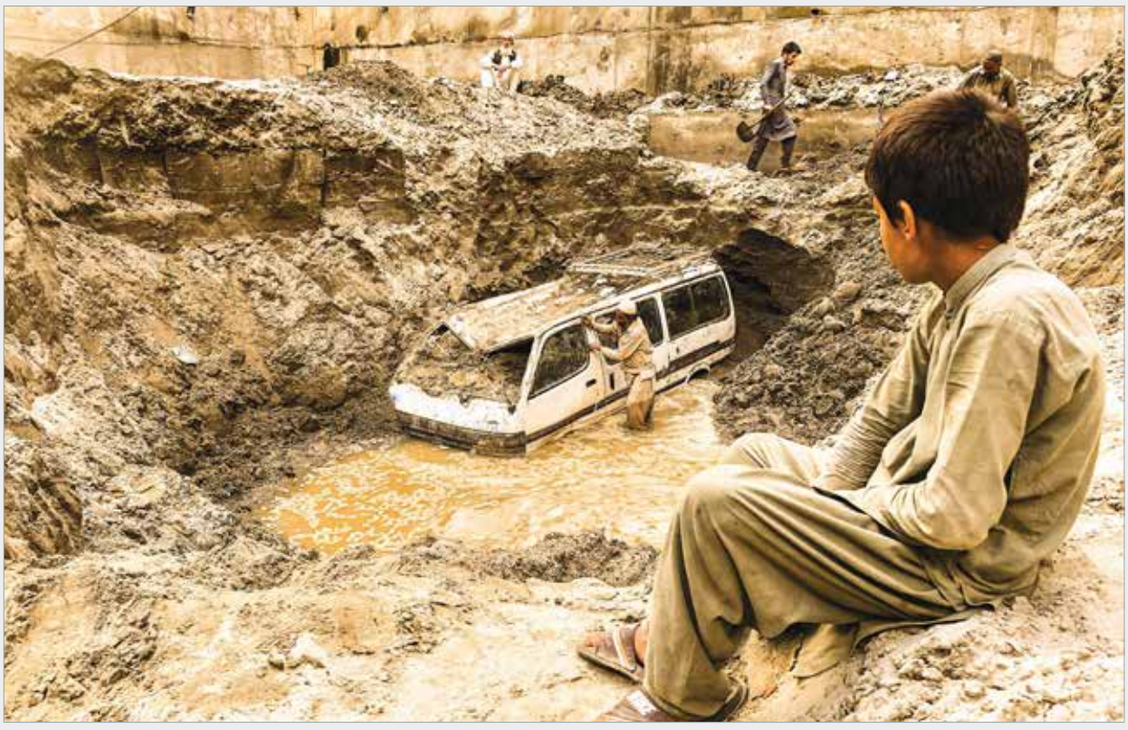






Can a Chinese AI weather system help Pakistan manage climate change?

MAZU offers faster forecasts and supports early warning systems, but its effectiveness depends on quality of data and disaster response capacity, writes Zofeen Ebrahim



THE first time Muhammad Irfan Virk entered the China Meteorological Administration (CMA) in Beijing, in 2024, he was captivated.

Virk was part of a team of Pakistan Meteorological Department forecasters sent to the CMA to help tailor its weather forecasting platform for use in Pakistan.

The system is known as MAZU, short for "multi-hazard, alert, zero-gap and universal".

The AI system cannot stop extreme weather, said Zaheer Ahmed Babar, Chief Meteorologist and Acting Director General, Pakistan Meteorological Department (PMD).

But by providing earlier warnings, it can "help forecasters make better and wiser decisions", he said.

"How we use that information to reduce losses is up to us."

The PMD has been using a version of MAZU tailored for Pakistan since October 2025, said Yin Shengxin, Science Attaché of the Chinese Embassy in Islamabad.

This is alongside other early warning tools, including data from other weather model datasets and satellites.

"Given Pakistan's pressing needs for early warning capabilities and disaster risk reduction, the two sides jointly developed and deployed the MAZU system, making Pakistan the first country to benefit from this innovative solution," said Yin.

In the aftermath of the August 26, 2026, floods in neighbouring Nepal and China, MAZU is also being used to assess and forecast local weather conditions for organising rescue efforts, reports *China Daily*.

Using the system, Chinese authorities have reportedly been providing Nepal with daily updates in aspects including the development and risk forecasts of newly formed barrier lakes, and emergency hydrological monitoring.

But while AI-weather modelling experts broadly welcome the use of the Chinese model, they say it is not a magic bullet for early warning systems.

MAZU TAKES CENTRE STAGE

At an April 2026 press conference announcing further international cooperation on MAZU's expansion, CMA administrator Chen Zhenlin said early warning systems offer a cost-effective way to protect lives and property as extreme weather threatens food and energy security.

At the 2026 World Artificial Intelligence Conference held in Shanghai in July, MAZU's booth proved popular, drawing huge crowds that included diplomats, engineers and journalists.

Its popularity may have been boosted by Chinese President Xi Jinping namechecking the system in his keynote speech at the conference.

"To further support global AI development and advance global AI capacity building, I hereby announce that in the next five years, China will provide developing countries with 5,000 opportunities in AI training and seminar programmes… and enable 30 countries to use the AI-powered meteorological warning system, or MAZU," he told attendees.

Babar of PMD said MAZU can be tailored to a country's geography, infrastructure and disaster risks by integrating local meteorological data.

Pakistani researchers and forecasters were trained to use a version calibrated to Pakistan's data, he noted.

MAZU has also been deployed in Djibouti, Ethiopia, Mongolia, Jordan, Sri Lanka and the Solomon Islands.

China is also supporting over 40 countries with cloud-based, virtual trials of the system.

"What makes the platform valuable is that it brings conventional meteorology, satellite and radar data, ground-station observations and local calibration together with AI insights and warnings," said Asim Javid, CEO of AI Geo Navigators, which uses AI, mapping data and remote sensing to gauge weather and environmental risk.

"Having all these inputs integrated in one place changes how forecasters work."

FROM INSIGHT TO REAL-WORLD VALIDATION

While AI-based weather tools support early warning systems, these are not "stand-alone systems sufficient to address our gaps… at least, not yet," said climatologist Imran Khalid.

An effective early warning system, Babar explained, requires a whole-of-government approach built around four basic components: Disaster risk management, detection and forecasting, dissemination and communication, and preparedness and response.

This holistic approach is endorsed by Junaid Yamin, Co-Founder, WeatherWalay, a Pakistani subscription weather forecast service.

"No single institution can tackle climate change alone. It requires breaking silos, sharing data and aligning government, business and civil society around a common mission," said Yamin.

Javid echoed this, arguing that weather data should be "open source".

"Rain and heat trigger many weather-related hazards, affecting businesses from telecom and banking to agriculture," he said.

"Access to weather data can help businesses design products that reduce disaster losses."

The WMO has been pushing for more "free and unrestricted exchange" of observational weather data through its 2021 unified data policy and its 2024-27 strategy, the latter emphasising partnerships with the private sector.

ONLY AS GOOD AS THE DATA FEEDING IT

Explaining how weather forecasts are generated, Babar said the atmosphere is "inherently chaotic".

Even small changes in air pressure, temperature, wind and humidity can make accurate forecasting impossible through conventional methods alone, he noted.

That is where systems like MAZU can help.

"It can solve complex mathematical equations in seconds, enabling forecasters to make faster, more timely decisions," noted Babar.

But these systems are only as good as the weather data feeding it.

"Unless we have good data, we will still be guessing and we will still be blind to the [potential] weather impacts," said Khalid.

Such programmes can predict ma-

jor events such as monsoons and heatwaves.

However, precise forecasts, such as when the monsoon will reach a particular valley in a mountainous region, or whether heat will trigger a glacial lake outburst flood, require dense, evenly distributed radar coverage that Pakistan lacks, he noted.

"Pakistan is a hard case," noted Javid.

Ground stations are sparse, and in the country's northern mountainous regions, terrain elevation can change dramatically over a few kilometres.

"Events that kill people happen at scales smaller than most global models [can forecast]," he noted.

MAZU cannot predict weather at the 1-km level, he said, and neither can most US and European models, which generally operate at around a 9-km resolution.

"It still depends entirely on the observations and models behind it," Javid explained.

"Without detailed ground data, AI tools can effectively hallucinate, producing confident local forecasts with no real observational basis, resulting in serious consequences," Khalid warned.

He said models can miss highly localised events, such as intense rain over a few neighbourhoods, or a cyclone's precise landfall timing and location, leaving communities unprepared.

This includes training on historical weather patterns and flagging uncertainties about results it produces where there are data gaps.

He questioned the PMD's technical capacity to manage the system, citing a World Bank-funded weather radar project that was ultimately scrapped, and an obsolete existing radar network long overdue for replacement.

Javid also pointed to another consideration: Accountability.

The use of an AI-supported system, such as MAZU introduces additional model outputs, or predictions based on processed data, and automated guidance.

These should be documented, while the authorised PMD forecaster retains responsibility for putting out the public warning, he noted.

"If a warning goes out, or an event is missed, someone has to be able to explain what produced that call. That needs traceability [of technical decisions] and a forecaster in the loop," he said.

"Every warning should have a clear audit trail showing the observations, model outputs, thresholds and professional judgement behind it."

He added that MAZU should make this judgement "sharper, not optional".

To see if MAZU really works better than existing systems, Javid said he would use three simple measures, and "set the rules before the season starts, not after seeing what happened".

First, he said, he would test how accurate MAZU's forecasts are against PMD's existing system and an independent benchmark, such as a recognised global forecasting system.

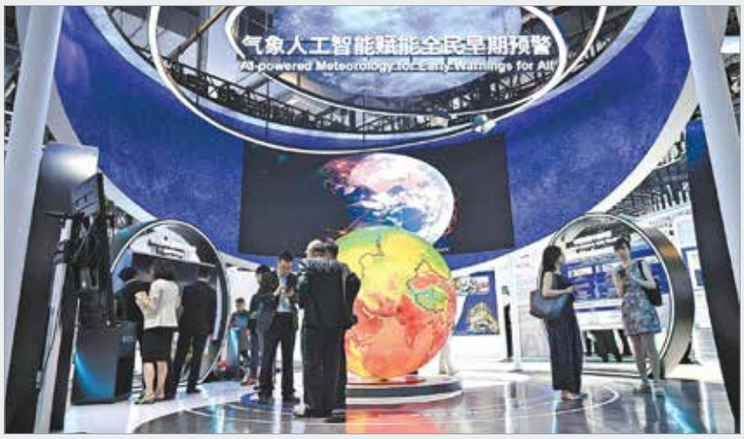
The second test would be hazard detection: "Can MAZU accurately identify dangerous weather events, not just predict ordinary weather?"

The third would be its practical value: how much extra warning time does it provide, and how many false alarms does it generate?

"For a deputy commissioner [the most senior administrator of a district], three extra hours to prepare can matter more than a small gain in temperature accuracy."

He added that he would test it for "two monsoon seasons at minimum, along with winter and mountain [terrain] cases. If MAZU proves better on forecast skill, hazard detection and lead time, it adds real value. Otherwise, it's a well-designed platform, not a validated one". ■

Zofeen was previously Pakistan editor at The Third Pole. She is an independent journalist based in Karachi and writer at the Thomson Reuters Foundation, Dawn and the Guardian. She also contributes regularly to the Inter Press Service. This article was originally published on Dialogue Earth under the Creative Commons BY NC ND licence.



China is supporting over 40 countries with cloud-based, virtual trials of the MAZU system

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World-first: Saudi solar park becomes breeding ground for threatened wildlife

THE Prince Mohammed bin Salman Royal Reserve is pioneering a global conservation first by breeding threatened gazelles within an operational solar park.

The park is spread over 505-hectares (ha) and powers Red Sea Global's AMAALA destination with 250 MW of 100 per cent renewable energy.

Following an initial seven-month proof-of-concept exercise launched in October 2025 involving Sand gazelle, Mountain gazelle, and Arabian hare, the programme formally entered its breeding phase in May 2026.

This phase commenced with the introduction of 33 female and 5 male Vulnerable Sand gazelles into the solar plant, with the first offspring anticipated in December 2026.

Population modelling indicates that the herd will expand to approximately 600 individuals by 2031, successfully surpassing the minimum founder population threshold of 500 animals required for successful reintroduction into the wider 24,500 sq km reserve.

The proof-of-concept trials confirmed that the site supports wildlife husbandry, as the solar park's predator-proof perimeter secures the area while panel shading reduces ground temperatures by 5-10 deg C.

Approximately 73 per cent of the 505 ha site constitutes usable habitat comprising shaded zones beneath panels and open terrain with rocky outcrops, increasing the Reserve's husbandry capacity 15-fold and allowing specialist ranger teams to maintain continuous monitoring of animal behaviour, health, and reproductive metrics. ■



From left, Nourah Al Aqabawai, Ranger, Daniel Blanco, former ASCE CEO, Andrew Zaloumis, Reserve CEO, Omar AlDaweesh, CEO Saudi Arabia and Bahrain, EDF Group, and Maen Al Smadi, Reserve Chief of Conservation, release a sand gazelle into the solar plant



Waterborne VpCI fogging replaces nitrogen for safer equipment preservation

Environment-friendly VpCI-337 eliminates pressurised gas risks, reduces operating costs, and forms a self-replenishing molecular barrier preventing internal corrosion without requiring chemical washdown

NITROGEN blanketing has long been a standard method for preserving idle industrial tanks, process vessels, and piping runs.

However, setting up pressurised gas lines is expensive, requires constant monitoring, and creates a serious suffocation risk for workers entering the area.

Cortec® Corporation's environment-friendly VpCI®-337 inhibitor is a direct, ready-to-use, complete replacement for nitrogen blankets and dry air systems.

Instead of maintaining inert gas pressures, maintenance crews mist the waterborne fluid directly into enclosed void spaces.

The vapour phase inhibitors diffuse through the air inside the enclosure, forming a protective molecular barrier on all exposed metal surfaces, including internal crevices, tube banks, and pipe bends that liquid coatings cannot reach.

Beyond improving safety and cutting operational costs, VpCI®-337 delivers a strong environmental advantage over traditional preservation methods.

Formulated as a waterborne, low-VOC liquid, it eliminates reliance on heavy, solvent-based rust preventatives that release harmful volatile organic compounds into the atmosphere.

The fluid is biodegradable, ensuring that facilities can manage chemical inventories responsibly without introducing persistent environmental contaminants.

Because it leaves only a thin, self-replenishing protective layer rather than a thick oily residue, plants do not need to perform chemical stripping or solvent degreasing prior to equipment restart.

This eliminates the generation of hazardous wash-water runoff, saving labour while supporting strict plant environmental standards.

Field applications across the global energy sector highlight the practical reliability of this approach.

At a major liquefied natural gas (LNG) project in Malaysia, an oil and gas operator sought a safer alternative to nitrogen blanketing for internal pipe preservation.



VpCI®-337 eliminates reliance on heavy, solvent-based rust preventatives

By fogging VpCI®-337 into pipe sections and inlet header boxes, the facility achieved 24 months of complete corrosion protection without the high maintenance costs or safety hazards of pressurised gas.

A similar success occurred at the South Humber Bank Power Station in the UK during a cold-weather shutdown.

Applicators fogged VpCI®-337 inside two heat recovery steam generators (HRSGs) to protect internal tube banks.

Plant engineers noted that the technique successfully prevented internal corrosion and completely eliminated corrosion dust upon unit start-up, simplifying the commissioning process while maintaining safe working conditions.

This provided a complete replacement for nitrogen blanketing, which is expensive to install and maintain and poses health hazards to personnel entering equipment interiors.

The treatment works across multiple metals, including steel, aluminium, cast iron, copper, and brass making it ideal for power generation assets, LNG piping runs, export shipping packaging, and double-wall void spaces.

For cold climates, Cortec® also produces VpCI®-337 Winterised, which handles application and storage down to -40 deg C (-40 deg F).

By replacing nitrogen blanketing with waterborne VpCI® technology, industrial facilities can significantly reduce operational risks without compromising on corrosion protection. ■



Technicians apply VpCI®-337 fogging fluid into equipment interiors to prevent internal corrosion



VpCI®-337 inhibitor is a direct, ready-to-use, complete replacement for nitrogen blankets and dry air systems

In Brief

Metacon launches hydrogen module



METACON has launched a compact 20-MW multi-level alkaline electrolysis module for large-scale hydrogen production.

The modular design reduces space requirements and simplifies installation, maintenance and expansion.

Compared with conventional building-based solutions, it offers potential savings of up to 30 per cent on steel structures, 50 per cent on piping systems and 70 per cent on area-related infrastructure, depending on project scope and site conditions.

LiqTech enables wastewater reuse

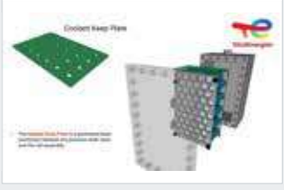


LIQTECH International will supply its QureFlow QF-6 ceramic membrane filtration system to WWIS's new industrial cleaning facility in Freeport, Texas.

The system is expected to recover more than 95 per cent of wastewater for reuse as wash water, reducing freshwater consumption and disposal volumes.

Designed to process 150-200 gallons per minute, it will also remove suspended solids, helping prevent equipment nozzle blockages.

TotalEnergies unveils battery safety tech



TotalEnergies Lubrifiants has introduced the Coolant Keep Plate (CKP), a passive technology designed to improve safety in immersion-cooled lithium-ion batteries.

The plate allows vent gases to escape while retaining dielectric coolant around exposed cells, reducing thermal runaway risks.

Requiring no sensors, controls or external power, the technology showed promising results in tests, with no fire or thermal runaway propagation observed in tested configurations.

Metatek extends geophysical tech deal



UK geophysical company Metatek has extended its exclusive partnership with Lockheed Martin for seven years and purchased a new enhanced Full Tensor Gradiometer (eFTG) instrument.

The technology improves airborne subsurface imaging accuracy, supporting exploration and lower-risk decision-making.

The agreement secures Metatek exclusive rights to acquire and use new Lockheed Martin eFTG systems, strengthening its position in geophysical exploration worldwide. ■

Robo.ai advances oil spill response venture in UAE

ROBO.AI has announced that its controlled subsidiary, Abu Dhabi-based industrial group ALIF Holding, has presented an integrated oil spill response system concept for its proposed ALIF Maritec venture, targeting ports, oil and gas terminals, offshore facilities, shipyards and coastal industrial sites.

The proposed system would integrate spill monitoring, containment, recovery and post-incident assessment, supported by engineering, training and maintenance services.

It aims to coordinate monitoring data, response equipment and operating teams, with configurations tailored to site conditions and the characteristics of spilled oil.

Human operators would retain responsibility for response authorisation, operational decisions and safety, according to the company.

The initiative comes amid the importance of maritime transport and energy infrastructure.

UN Trade and Development (UNCTAD) estimates that shipping carries more than 80 per cent of global merchandise trade by volume.



The system integrates spill monitoring, recovery and support services

Separately, Mordor Intelligence estimates the global oil spill remediation materials market at $4.23 billion in 2025, projecting growth to $5.22 billion by 2031.

ALIF Maritec forms part of ALIF Holding's wider industrial development plans.

On September 25, 2026, the group held a groundbreaking ceremony for Phase I of its industrial park in Umm Al Quwain.

The development includes refurbishment of existing factory premises covering approximately 8,845 square metres of designed gross floor area.

ALIF Maritec is expected to be the first project to occupy the site once refurbishment is completed and operational readiness is achieved.

The group plans to evaluate pilot opportunities in the UAE, alongside technical validation, local equipment integration, assembly, training and maintenance capabilities.

Implementation remains subject to technical results, partnerships, funding, site readiness and required approvals. ■

BASF debuts Glythermin fluids for AI data centres

BASF has launched its Glythermin heat transfer fluid portfolio for liquid-cooled data centres, targeting the growing thermal management demands of artificial intelligence (AI) and cloud computing infrastructure.

The company's Glythermin DC and Glythermin PG products are designed to support primary cooling loops and direct liquid cooling (DLC) applications, helping data centre operators manage increasing heat loads while maintaining system reliability and energy efficiency.

According to BASF, global data centre capacity has nearly doubled over the past five years, while AI workloads are driving server rack power densities to unprecedented levels.

Processors and graphics processing units (GPUs) used for AI applications can generate heat loads exceeding 150 kilowatts per rack, pushing conventional air-cooling systems towards their limits.



BASF's Glythermin enhances liquid cooling performance

Direct liquid cooling addresses this challenge by transferring heat directly from processors and GPUs through circulating coolant to a coolant distribution unit, which regulates flow, temperature and pressure.

BASF said its Glythermin portfolio combines propylene glycol chemistry with corrosion protection technologies to deliver reliable cooling performance and long-term system protection.

The formulations are designed to extend coolant service life while reducing inhibitor consumption and protecting equipment against corrosion, ageing and deposit formation.

Glythermin DC PG 25 has also qualified as an NVIDIA DSX Ready Coolant, meeting applicable NVIDIA PG25 fluid requirements for secondary-loop, single-phase cold-plate cooling applications. ■

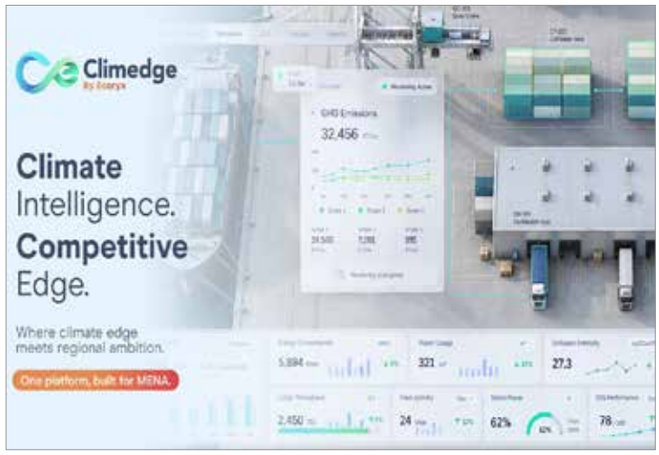
Ecoryx unveils AI tool for emissions tracking

ECORYX, a Saudi-founded sustainability solutions provider, has launched Climedge, an artificial intelligence (AI)-powered platform designed to help companies manage sustainability data, track emissions and translate climate commitments into measurable action.

The platform integrates data from existing business systems to automate emissions tracking and generate audit-ready reports aligned with international frameworks, including the Global Reporting Initiative (GRI).

It also features an interactive chatbot and analytical insights to support sustainability reporting and decision-making.

The launch comes as investors, regulators and customers increasingly expect businesses to provide accurate, transparent information on emissions, environmental performance and progress towards sustainability targets.



However, companies often face challenges managing fragmented data across spreadsheets and disconnected systems, alongside evolving reporting requirements and inconsistent calculation methods.

Climedge uses AI to organise sustainability data, identify gaps and convert information into structured reports, helping businesses improve data reliability and make informed decisions.

The platform's introduction coincides with Saudi Arabia's Year of Artificial Intelligence and aligns with the Kingdom's Vision 2030 objectives, which include advancing AI adoption, developing digital infrastructure and supporting environmental sustainability. ■

Envision unveils AI-powered 8 MW wind turbine

ENVISION Energy has launched its Model T–EN175/8.0, an 8 MW-class onshore wind turbine featuring a 175-m rotor, at WindEnergy Hamburg.

Designed for medium-wind-speed sites and challenging operating environments, the turbine combines advanced aerodynamics, integrated drivetrain technologies and artificial intelligence (AI)-powered controls to improve energy generation and operational efficiency.

Built on Envision's Model T platform, which has recorded more than 4,000 orders and around 1,500 installations, the new model incorporates sixth-generation low-noise aerodynamic technology and components designed and manufactured in-house, including blades, gearboxes and generators.

According to the company, the EN175/8.0 can increase energy yield by 2-12 per cent, depending on site conditions.

Its design also targets a sound power level of 107 dB(A), with optional low-noise operating modes for noise-sensitive locations.



The T model uses AI to boost efficiency in challenging conditions

The turbine is engineered for varied environments, including mountainous terrain, regions with extreme winds and cold or icing-prone climates.

Optional blade ice-prevention technology supports operation in challenging weather conditions.

A key feature is its Galileo autonomous optimisation system, powered by Envision's Tianji Weather Foundation Model and Dubhe Energy Foundation Model.

The AI-enabled technology analyses real-time operating conditions and adjusts control strategies to optimise performance and reduce the need for manual intervention.

The turbine also incorporates a full-power converter and grid-forming controls to support voltage and frequency stability, respond to grid faults and operate in weaker grid conditions. ■

In Brief

Zamil plans shallow-draft vessel



ZAMIL Offshore has contracted Conoship International to design a shallow-draft Dive Support Vessel for Gulf subsea operations.

With a maximum draft of 2.5 m, the 76.2-m vessel will feature DP2 positioning, diving systems, ROV capabilities and a 20-tonne crane.

Its optimised hull and diesel-electric propulsion aim to reduce fuel consumption while maintaining operational performance and meeting ABS class rules and SPS Code requirements.

Reliable, cost-effective gas detectors



TELEDYNE Gas and Flame Detection unveiled its new-generation FREEDOM range of gas detectors designed for industrial sites where gas detection technologies must demonstrate reliable monitoring with minimal maintenance requirements.

Available in three models, Freedom GP, XP and Xi, the range provides detection solutions for applications spanning oil and gas, general industry, utilities, water treatment, laboratories and hazardous environments among others.

X-energy advances SMR



X-ENERGY is developing its Xe-100 small modular reactor (SMR), which uses helium as a coolant to generate electricity and high-temperature steam for industrial applications. Each unit is designed to produce 80 MWe and 200 MWt.

The technology aims to improve efficiency and support industrial decarbonisation, with proposed four-unit projects in Texas and Washington targeting deployment in the 2030s.

Rockwell enhances OT security



ROCKWELL Automation has expanded its SecureOT industrial cybersecurity suite with two services: Firewall Managed Services with Fortinet and Infrastructure Managed Services. The offerings provide 24/7 monitoring, maintenance and security management for industrial operational technology environments.

Supporting Fortinet firewalls and existing customer-owned infrastructure, the services aim to reduce cyber risks, improve operational resilience, maintain uptime and simplify industrial cybersecurity management for manufacturers. ■

In Brief

SPARK, Dalipal sign $2.1bn deal

KING Salman Energy Park (SPARK) and Dalipal Holdings have signed a 25-year land lease agreement to establish a major manufacturing facility in Saudi Arabia.

Dalipal International for Industry Company will develop the 1.03 million-sq-m site to serve regional and international markets.

The project involves a planned investment of $2.1 billion, with $600 million allocated to the first phase.

The facility will manufacture seamless steel pipes, including oil country tubular goods, drill pipes and hydrogen pipes.

DT, EnerVenue explore storage solutions

DESERT Technologies (DT) has signed a memorandum of understanding with energy storage specialist EnerVenue to explore advanced energy storage solutions in Saudi Arabia.

The collaboration will assess applications of EnerVenue's Aqueous Metal Cell technology across mining, oil and gas, data centres, microgrids and telecommunications.

The companies plan to launch a 215 kilowatt-hour pilot project in the first quarter of 2027, supporting reliable and flexible power solutions for critical sectors across the Kingdom.

Vulcan eyes Mena growth

VULCAN Completion Products is targeting further growth across the Middle East and North Africa (Mena), driven by advanced completion technologies, regional partnerships and manufacturing expansion.

With customers in 50 countries and 58 patents, the company is strengthening its Saudi presence through strategic partner Sawafi Al-Jazeera.

Its technologies aim to improve well performance, operational efficiency and reliability, while increased manufacturing capacity and localisation efforts support its expansion across key Middle Eastern markets.

Applus+ completes Jubail inspection

APPLUS+ has completed specialised tube inspection services for the Train 2 Turnaround 2025 at Jubail Industrial City 2, supporting a major oil and gas client in Saudi Arabia.

The project used advanced inspection techniques, including Eddy Current Testing and Magnetic Flux Leakage, to assess equipment integrity and reliability.

Completed with zero Lost Time Injuries across 17,148 safe working hours, the work highlights Applus+'s technical expertise and commitment to safety.

L&T KSA partner on renewables training

L&T Renewables KSA has signed an MoU with Onaizah Colleges to prepare Saudi students for renewable energy careers, supporting Vision 2030 and the Kingdom's energy transition.

The agreement covers practical training, internships, cooperative programmes, research and professional development.

The partnership will also explore employment opportunities at L&T for qualified graduates.

The initiative aims to equip students with industry-relevant skills and strengthen Saudi Arabia's local workforce to support the country's expanding renewable energy sector. ■

Saudi Arabia eyes doubling East-West Pipeline capacity

SAUDI Arabia is considering expanding the capacity of its strategic East-West Pipeline to around 10 million barrels per day in the coming years to strengthen global energy security and mitigate oil supply disruptions.

Prince Abdulaziz bin Salman bin Abdulaziz, Energy Minister, outlined the potential expansion during a ministerial dialogue on global oil and gas markets at the 25th WPC Energy Congress in Riyadh.

The proposed upgrades would cover pumping stations, transmission pipelines and the Kingdom's gas system, reinforcing critical infrastructure and ensuring reliable oil transportation during market disruptions.

Prince Abdulaziz highlighted the pipeline's origins in the early 1980s, when the late King Fahd bin Abdulaziz Al Saud directed the development of alternative export routes to diversify Saudi Arabia's oil transportation network.

Subsequent directives in the 1990s increased its capacity to five million barrels per day.



East-West Pipeline expansion targets 10 million barrels per day

The minister said government-funded investments in the pipeline and the Master Gas System had strengthened national assets and supported Saudi Arabia's contribution to global energy stability.

Haitham Al Ghais, OPEC Secretary General, also stressed the pipeline's importance as a safeguard against market volatility and rising energy demand driven by urbanisation and artificial intelligence.

Al Ghais warned that insufficient investment could threaten future supply, noting that the global oil and gas industries require an estimated $18 trillion in investment through 2050.

The proposed expansion comes amid growing uncertainty in energy markets, underscoring the importance of reliable infrastructure and diversified export routes. ■

Lamprell, IMI sign Saudi offshore fabrication deal

LAMPRELL has signed an agreement with International Maritime Industries (IMI) to fabricate offshore structures, including a production platform and jackets, for an offshore Engineering, Procurement, Construction and Installation (EPCI) project being delivered by Lamprell.

Fabrication will take place at IMI's facility in Ras Al-Khair, Saudi Arabia, marking the first time the facility will undertake offshore production platform and jacket fabrication.

Ian Prescott, CEO of Lamprell, commented: "IMI is an important strategic partner for Lamprell, and as a founding shareholder, we are proud to support the continued development of its yard in the Kingdom of Saudi Arabia. This agreement allows us to draw on Lamprell's extensive offshore EPCI and fabrication experience while supporting the continued development of IMI's capabilities and sharing our expertise in the Kingdom. We look forward to building on this important relationship to further develop capability in the Kingdom and support its offshore energy ambitions."



Abdullah Al-Ghamdi, Chief Executive Officer of IMI, said: "This agreement is a defining step in IMI's journey beyond shipbuilding. By taking on the fabrication of offshore structures for the first time, we are demonstrating the depth and versatility of our capabilities and reinforcing our role as a diversified, world-class industrial partner to Saudi Arabia's energy sector. Being entrusted with this scope is a strong validation of our fabrication track record, and we look forward to delivering the same quality and reliability our partners have come to expect from IMI." ■

Honeywell to support GPIC's Bahrain aromatics complex

HONEYWELL Technologies has been selected by Gulf Petrochemical Industries Company (GPIC) to provide licensing and engineering services for a new aromatics complex in Bahrain.

The project will be developed at GPIC's existing industrial complex in Sitra and will support the production of key petrochemical building blocks used across a broad range of consumer and industrial applications.

The facility is expected to produce approximately 1.2 million metric tonnes of paraxylene and 500,000 metric tonnes of benzene annually (mtpa) using proven process technologies, including Honeywell Technologies UOP's Naphtha Hydrotreating, CCR Platforming and LDPX Aromatics Complex.

These products serve as essential feedstocks for plastics, polyester fibres and packaging materials, helping meet growing global demand across consumer and industrial markets.

Honeywell Technologies UOP will be providing the licensing, engineering and associated engineering services, along with catalysts, adsorbents and equipment as a part of its scope.

"By collaborating with Honeywell Technologies UOP on this new aromatics complex, we are investing in world-class technologies that will strengthen our production capabilities, support long-term industrial growth and enable us to meet evolving market demand for essential petrochemical products," said Yasser Alabbasi, Chief Executive Officer of GPIC.

"GPIC's selection of Honeywell Technologies UOP reflects its confidence in our technologies and execution capabilities," said Mohamed Sami, General Manager Saudi Arabia and Bahrain for Process Technology, Honeywell Technologies. "This project will help enable the efficient production of high-value petrochemical products while strengthening the Kingdom of Bahrain's industrial base." ■



The facility will produce 1.2 mtpa of paraxylene and 500,000 mtpa of benzene

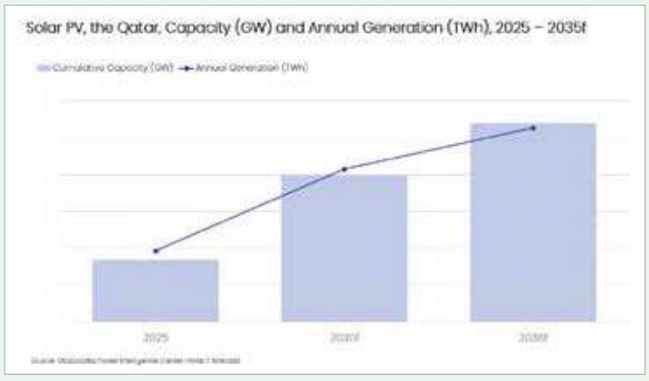
Qatar solar capacity set to grow 12.4pc annually

QATAR is accelerating utility-scale solar development to diversify its energy mix, reduce domestic gas consumption and curb emissions, while retaining natural gas as the backbone of power generation, according to GlobalData.

The intelligence firm's latest report forecasts Qatar's installed power capacity will grow at a compound annual growth rate of 4.2 per cent between 2025 and 2035.

Solar photovoltaic capacity is expected to expand by 12.4 per cent annually, increasing renewables' share of total power capacity from 12 per cent in 2025 to 25.9 per cent by 2035.

Major projects, including Al Kharsaah, Ras Laffan, Mesaieed and the planned Dukhan development, are supporting the transition towards a hybrid electricity system, said Attaurrahman Saibasan, power analyst at GlobalData.



However, natural gas will remain essential, accounting for about 74 per cent of cumulative capacity in 2035.

Gas-fired combined-cycle turbines and cogeneration plants supply dispatchable electricity during peak summer demand while supporting seawater desalination.

Qatar aims to reach 4GW of renewable capacity by 2030, requiring flexible gas generation and improved grid management.

Government initiatives, including the Qatar National Renewable Energy Strategy and Kahramaa's net-billing regulations, support deployment.

The expansion is also intended to free up natural gas for liquefied natural gas exports while meeting rising industrial demand and maintaining grid reliability. ■

In Brief

Agility Global to sell Tristar for $1.5bn

AGILITY Global has agreed to sell its entire stake in energy logistics business Tristar to India's Aegis Logistics in a deal valuing Tristar at $1.5 billion.

The transaction, subject to regulatory approvals, is expected to close by the end of March 2027.

Under Eugene Mayne, CEO, Tristar expanded from a domestic transport operator into a global logistics platform operating in more than 30 countries.

Its assets include over 1,000 trucks, 26 vessels and 14 fuel farms.

Viking to launch Saudi JV

VIKING Completion Technology (Viking) has established a joint venture with Abdulrahman Algosaibi Holdings to launch an API-certified manufacturing, testing and service facility in Saudi Arabia.

Located in Dhahran, the facility will manufacture and service completion equipment, including safety valves, packers and seal assemblies.

Holding key API certifications, it enables Viking to supply locally manufactured products directly to Saudi customers, reducing delivery times and logistics challenges.

The development follows five years of investment and complements Viking's established Dubai operations.

KSA, IEF sign clean energy MoU

SAUDI Arabia's Ministry of Energy and the International Energy Forum (IEF) have signed an MoU to strengthen cooperation on clean energy, climate change mitigation and Circular Carbon Economy (CCE) solutions.

Signed during the 17th IEF Ministerial Meeting in Riyadh, the agreement will promote technology-neutral approaches, knowledge exchange, research and regional collaboration to reduce emissions, enhance energy security and affordability, and advance sustainable energy solutions across the region.

SQU opens $4m energy lab

SULTAN Qaboos University (SQU) has inaugurated a RO1.5 million ($4 million) Sustainable Energy Research Centre Laboratory in partnership with Oxy Oman to advance energy research and innovation.

The facility will focus on hydrogen, alternative fuels, energy efficiency and carbon capture. Separately, SQU and the Ministry of Energy and Minerals launched the second Kafa'a training programme, targeting 295 participants and supporting startups to strengthen energy efficiency and national expertise.

Canrig expands Titan globally

CANRIG will introduce its Titan automated wrench to the eastern hemisphere in early 2027, following deployments in North America.

Designed to improve tubular connection quality and drilling efficiency, the technology reduces operational variability and equipment wear.

Testing showed a 40 per cent reduction in make-up sequence time and a 30 per cent reduction in break-out time compared with a competitor wrench, supporting safer operations, increased rig productivity and lower total cost of ownership. ■

In Brief

PIF Energy plans $2bn tanker fleet

PIF Energy has announced a planned $2 billion investment to acquire up to 15 crude oil tankers, aiming to strengthen shipping capacity amid disruptions around the Strait of Hormuz and tightening fuel markets.

The company expects to complete initial acquisitions within three to four weeks, subject to due diligence and vessel availability.

Ben Morrow, CEO, said the investment would support reliable crude deliveries to refineries, complement emergency reserve releases and help ease transport bottlenecks affecting global fuel supplies.

New IEF advisory council members

THE International Energy Forum (IEF) has welcomed EDF power solutions and Hitachi Energy to its Industry Advisory Council, strengthening industry expertise in renewable energy, electricity grids and energy security.

EDF power solutions develops wind, solar and battery storage projects, while Hitachi Energy specialises in power grids, electrification and digital technologies.

Their participation will support dialogue on modernising electricity networks, integrating renewable generation, meeting rising demand and advancing secure, affordable and sustainable energy systems.

Fluor secures LNG Canada contract

FLUOR Corporation and its joint venture with JGC Corporation have secured a contract for Phase 2 of LNG Canada's export facility in Kitimat, British Columbia, following a final investment decision.

Fluor will recognise its $7.5 billion share in the third quarter of fiscal 2026.

The expansion will add two liquefaction trains and a storage tank, doubling the facility's production capacity to approximately 28 million tonnes annually.

Google, Constellation sign nuclear deal

GOOGLE and Constellation Energy have signed a 20-year power purchase agreement to add 890 MW of nuclear capacity to the PJM grid through upgrades at 11 existing reactors across Illinois, Pennsylvania and New Jersey.

The project represents more than $4.3 billion in investment and is expected to create 7,200 construction jobs.

The first capacity upgrade is targeted for 2028.

Separately, Oracle will purchase electricity from Constellation's Point Beach nuclear power plant.

India expands polyethylene output

INDIA is expected to become the world's second-largest contributor to polyethylene capacity additions by 2030, behind China, accounting for over 14 per cent of global growth, according to GlobalData.

Thirteen upcoming projects will help reduce import dependence and meet rising domestic demand.

Bharat Petroleum's Bina plant in Madhya Pradesh is expected to begin operations in 2028, while additional projects by Bharat Petroleum and Haldia Petrochemicals are scheduled to start production by 2030. ■

Secure shipping urged to stabilise oil markets

THE Organisation of the Petroleum Exporting Countries (Opec) and non-Opec countries reaffirmed their commitment to oil market stability, calling for secure maritime routes to ensure uninterrupted energy supplies.

Meeting in Riyadh on October 12, alongside the 17th International Energy Forum ministerial meeting and the 25th WPC, ministers reviewed market conditions and agreed to continue consultations through established Opec+ mechanisms, including the Joint Ministerial Monitoring Committee (JMMC) and ministerial meetings.

They reaffirmed decisions made at the 41st Opec and non-Opec Ministerial Meeting on June 7, 2026, aimed at sustaining market stability.

Ministers warned that disruptions to energy flows had pushed shipping and insurance costs to unprecedented levels, exceeding one-third of commodity value.

Rising costs are delaying crude oil and petroleum product deliveries, increasing inflationary pressures and burdening producing and consuming countries.



Energy disruptions have pushed shipping and insurance costs above of commodity value

They pledged to monitor developments and engage with governments, industry stakeholders and international organisations, including the International Energy Forum (IEF) and International Energy Agency (IEA), to improve shipping conditions.

Separately, Opec lowered its forecast for global oil demand growth in 2026 to 400,000 barrels per day (bpd), down from 1.4 million bpd estimated at the beginning of the year.

Haitham Al Ghais, OPEC Secretary-General, said the revision reflects developments during 2026.

He expects deferred consumption to support demand growth in 2027 as postponed purchases resume.

Market expectations are also being shaped by anticipated increases in Russian fuel supplies following US President Donald Trump's announcement of an agreement to supply Russian diesel to American and global markets.

Reports of a potential Russia-Ukraine agreement to halt reciprocal attacks on energy facilities have further influenced market expectations and supply outlooks. ■

Gas share in power generation set to hit 39pc by 2055

NATURAL gas is expected to play a growing role in power generation by providing reliable and flexible supply as renewable energy capacity expands.

The share of gas demand attributed to power generation is forecast to rise from 35 per cent in 2024 to 39 per cent by 2055, while demand for residential applications, including heating, is expected to decline.

Abubakar Abbas, senior energy forecast analyst at the Gas Exporting Countries Forum (GECF) said natural gas and renewable energy would account for a significant share of future demand growth, creating investment opportunities across gas production, infrastructure and international trade.

The changing energy mix is also expected to reshape global gas trade, with liquefied natural gas (LNG) playing a greater role in connecting producing regions with international markets.



Credit: Below the Sky/ Shutterstock

Abubakar Abbas ... the share of gas in power generation will grow

North America, Eurasia, the Middle East, Africa and Latin America are expected to contribute to future supply, while demand growth is anticipated across several regions, including Africa and the Middle East.

Abbas highlighted the scale of investment required to meet projected consumption, noting that 86 per cent of global natural gas production by 2055 is expected to come from fields that are not currently producing.

This will require accelerated exploration, resource development and project execution.

Meanwhile, demand for more carbon-intensive fuels such as coal is expected to decline as natural gas and renewables assume greater roles in meeting global energy needs. ■

Renewables need to reach 38.2 TW by 2050: Irena

THE International Renewable Energy Agency (Irena) has called for faster electrification, renewable energy deployment and energy efficiency improvements to align the global energy transition with the 1.5 deg C climate pathway.

Its 2026 World Energy Transitions Outlook warns that record renewable energy additions are being undermined by inadequate grid infrastructure, rising energy demand and insufficient efficiency gains.

Irena estimates that global installed renewable power capacity must increase from 5.2 terawatts (TW) currently to around 38.2 TW by 2050.

Electricity must account for 35 per cent of final energy consumption by 2035 and more than 50 per cent by 2050, with solar and wind supplying over 80 per cent of global electricity by mid-century.

The report stresses that expanding renewables alone will not deliver the transition without significant investment in grids, energy storage, system flexibility and electrification.



IRENA estimates $10.3 trillion in cumulative annual energy investment from 2026 to 2050

Credit: Shutterstock AI

Under Irena's 1.5 deg C scenario, global economic growth could exceed business-as-usual projections by 1.1 per cent annually, generating cumulative economic gains of approximately $46 trillion by 2050.

Renewable energy employment could also increase more than fivefold from just over 16 million jobs today, while electricity prices for end-users could be 15 per cent lower by 2050.

Achieving these outcomes would require cumulative annual investment of around $10.3 trillion between 2026 and 2050, primarily in renewable power, grids, flexibility and end-use electrification.

Irena urged governments to modernise infrastructure, strengthen investment strategies and ensure affordability, energy security and equitable access remain central to the transition. ■

Utilities prioritise grid reliability, AI investment

GLOBAL utilities are shifting investment priorities towards grid reliability, infrastructure resilience and affordability, while continuing to pursue decarbonisation, according to new research by IFS.

The study, conducted by Censuswide among 850 senior utility executives, found that ageing infrastructure, extreme weather, cybersecurity threats and rising electricity demand from data centres and electrification are driving a more balanced investment strategy.

The findings show that 26 per cent of utilities are reassessing asset portfolios to prioritise existing grid infrastructure.

Industrial AI is also gaining importance, with 57 per cent of executives identifying it as critical to reducing operational costs and 47 per cent saying it is essential for optimising asset performance and managing rising demand.

However, data fragmentation remains a major obstacle to modernisation. Nearly half of respondents (49 per cent) said operational data silos hinder real-time decision-making, while only 33 per cent described their asset lifecycle management capabilities as advanced.

A further 51 per cent reported using asset management systems that operate in silos with limited predictive capabilities.

Utilities are also exploring energy storage and new generation technologies to strengthen supply security.



57 per cent of utilities see AI critical for cost cuts

Advanced geothermal energy was identified by 22 per cent of respondents as having the greatest long-term impact on securing clean baseload power, followed by small modular reactors at 18 per cent.

Meanwhile, 46 per cent said AI was critical to accelerating renewable and distributed energy integration.

The research highlights the growing need to combine targeted infrastructure investment, modern asset management and AI to improve reliability, control costs and support the energy transition. ■

In Brief

OPITO calls for skills recognition

OPITO'S new One Safety Vision report finds that over two-thirds of APAC employers require additional training or certification before hiring workers from adjacent safety-critical sectors.

The survey reveals 57 per cent report trust gaps due to unrecognised qualifications, despite strong confidence in workforce competence.

OPITO calls for globally aligned training standards and clearer certification recognition to improve workforce mobility, strengthen safety and support collaboration across the region's energy and mining industries.

Bentley names energy winners

BENTLEY Systems has announced its 2026 Year in Infrastructure Award winners, recognising energy projects using digital technologies to improve infrastructure delivery.

China's Chongqing Yunyang Jianquan Pumped Storage Digital Power Station won the Energy Production category, while Australia's Clean Energy Link-North project, using AI-driven digital delivery for renewables, won Transmission and Distribution.

The awards featured more than 300 project nominations from 53 countries across 12 categories in various sectors.

Foss closes $58m GridStor storage deal

FOSS & Company has closed a $58 million tax equity partnership with GridStor to finance a utility-scale battery energy storage system in Hidalgo County, Texas.

The transaction generates Section 48 investment tax credits, with the asset scheduled to enter service in October 2026.

The deal marks the companies' second collaboration, reflecting growing investor confidence in battery storage to strengthen grid reliability and flexibility.

It also expands Foss & Company's renewable energy tax equity portfolio.

Renewables gain in South Africa

RENEWABLE energy is expected to overtake thermal generation in South Africa's installed capacity mix by 2035, driven by solar and wind expansion, according to GlobalData.

The country's power capacity is forecast to grow at a 3.5 per cent annual rate between 2025 and 2035.

Market reforms are encouraging private investment and corporate power agreements, but limited transmission capacity remains a key obstacle.

Investment in battery storage and grid infrastructure will be critical to replacing retiring coal plants and improving reliability.

2026 Women in Energy winners

WOMEN in Energy has announced its 2026 Annual Awards, recognising five professionals for leadership, mentorship and industry contributions.

Allison Heaney of Skaggs-Walsh received Woman of the Year, while Amber Luzi of Tevis Energy, Kelly Brown of Lehigh Fuels and Tara Clerkin of Cetane Associates won EmpowerHER awards.

Diane Cichocki of Ross Enterprises received the Judy Garber Rising Star Award.

The awards were presented during the association's annual conference in Massachusetts. ■

In Brief

South Sudan, UAE sign oil deal

SOUTH Sudan's Ministry of Petroleum has signed an investment memorandum with UAE-based Bianchi Gold Trading Investment Company to support oil and gas exploration, infrastructure, refining and distribution.

The agreement aims to attract financing, technology and technical expertise. South Sudan has 14 open concession blocks and 3.5 billion barrels of proven oil reserves, with the government targeting production growth to 230,000 barrels per day in the short term.

Ivory Coast seeks $10bn investment

IVORY Coast is targeting more than $10 billion in energy investment by 2030, with state-owned Petroci Holding seeking partners for upstream projects, exploration, gas infrastructure and refining.

Key developments include the $4 billion Baleine field expansion, targeting 150,000 barrels of oil daily, and a proposed $5 billion-$7 billion refinery in San Pedro.

Investments in petroleum storage and distribution also aim to strengthen domestic supply, reduce logistics costs and expand fuel exports to neighbouring markets.

Africa Energy Bank targets 2027 launch

THE Africa Energy Bank (AEB) is expected to become operational within weeks and begin financing projects in early 2027, Farid Ghezali, APPO Secretary General said.

Launched by APPO and Afreximbank, the bank will prioritise export infrastructure, domestic gas supply, clean cooking and power.

Industry experts estimate Africa will require at least $1 trillion over 30 years to develop its gas resources, while regional cooperation is needed to accelerate pipelines and cross-border energy infrastructure.

Ghana oil production rises 30pc

GHANA'S crude oil production has risen 30 per cent, reversing five years of decline, Energy Minister John Abdulai Jinapor announced.

The increase follows a $2 billion agreement with Kosmos Energy covering Jubilee and TEN licence extensions to 2040.

The partnership includes plans for additional drilling and increased domestic gas supply.

Ghana is also pursuing agreements with Chevron, Shell and CNOOC while reforming its fiscal regime to attract further upstream investment.

Moagi leads APPO Forum

GODFREY Moagi, South African National Petroleum Company CEO, has been appointed chairman of the African Petroleum Producers' Organisation's NOCs CEOs Forum, succeeding Ghana's Kwame Ntow Amoah.

Moagi outlined three priorities: developing viable refining capacity, accelerating the Africa Energy Bank to finance strategic infrastructure, and strengthening cooperation among African national oil companies to build technical skills and local expertise across the continent's energy value chain. ■

Africa needs $125bn for refining by 2050: Opec

AFRICA will require at least $125 billion in refining investment through 2050 to develop new projects, upgrade existing facilities and maintain infrastructure, as oil demand is projected to nearly double, according to the Organisation of the Petroleum Exporting Countries (Opec).



African refineries operate at 55 per cent capacity, processing less than 3 million bpd.

The continent's oil demand is expected to rise from 4.9 million barrels per day (bpd) to 9.2 million bpd by 2050, while refining capacity is forecast to increase by 3.2 million bpd to approximately 7.9 million bpd.

Abderrezak Benyoucef, Head of Opec's Energy Studies Department, said African refineries currently operate at around 55 per cent utilisation, processing less than 3 million bpd.

Utilisation is projected to reach 80 per cent by 2050, although capacity will remain insufficient to meet demand.

Haitham Al Ghais, Opec Secretary General, said Africa's population could grow by around 917 million by 2050, while its economy expands by an average of 4.4 per cent annually.

The continent holds an estimated 120 billion barrels of proven crude oil reserves and 18 trillion cubic metres of proven natural gas reserves.

Al Ghais called for greater access to financing for energy projects to support economic development and energy security.

African liquids supply currently stands at approximately 7.6 million bpd, accounting for 7 per cent of global output.

However, Opec projects that around 700 million Africans could still lack access to clean cooking by 2050 under its reference scenario.

Stronger economic growth and increased technology investment could reduce that figure. ■

Cameroon opens six blocks in 2026 O&G bid round

CAMEROON'S Société Nationale des Hydrocarbures (SNH) has launched its 2026 bid round, offering six exploration blocks across three sedimentary basins to attract investment and expand hydrocarbon development.



The six blocks have 2D seismic data coverage

The acreage comprises Ndian River and Bakassi in the Rio del Rey Basin, Kombe-Nsepe and Bomono in the Douala/Kribi-Campo Basin, and Zina and Makary in the Logone Birni Basin. All six blocks have 2D seismic data coverage.

Pierre Eric Nkoa Nkoa, Deputy Exploration Manager at SNH, said bid submissions would remain open until May 28, 2027, with results expected in June 2027.

Across Africa, companies are seeking partners to fund seismic surveys, exploration drilling and field development.

In Somalia, SOMA Oil & Gas is seeking co-funding for 3D seismic surveys across three production-sharing agreements, while Sierra Leone's FA Oil is seeking drilling partners for Licence 001/23.

Ghana offers further opportunities, with GeoPartners planning a large-scale 3D seismic survey in early 2027 and AMNI International offering participation in its 90 per cent interest in Offshore Central Tano.

Ivory Coast's Harvex and Petroci are also seeking pre-funding for seismic acquisition on deepwater Block CI 604.

In Central Africa, Chad's CGIP is seeking partners for drilling and field redevelopment, while Gabon has 26 blocks available across onshore and ultra-deepwater acreage.

Angola is also promoting exploration opportunities in the Kwanza Basin.

Southern African prospects include Namibia's Orange Basin Block 2712A and gas development opportunities in South Africa's Northern Karoo region.

Beyond Africa, Grenada is preparing a 2027 licensing round, while the UAE's Sharjah National Oil Company is promoting gas discoveries and exploration acreage. ■

African NOCs to boost energy cooperation

AFRICAN national oil companies (NOCs) have signed a non-binding declaration to strengthen commercial cooperation, expand refining capacity and improve energy security across the continent.

The Cape Town Declaration was signed during the 8th Meeting of the APPO NOCs CEOs Forum in Cape Town, overseen by Godfrey Moagi, CEO of the South African National Petroleum Company (SANPC) and chairman of the forum.

The agreement encourages direct commercial deals between African NOCs for crude oil and refined products, subject to national laws and competition rules.

It also aligns participating companies with the African Petroleum Producers Organisation's (APPO) Long-Term Strategy 2050, which promotes sustainable resource development and greater energy independence.

Signatories pledged to expand domestic refining capacity and reduce reliance on imported petroleum products, supporting the African Refining Industry Upgrading Strategy Programme and the African Refining Model.



The agreement promotes crude oil and fuel trade between African NOCs

They also welcomed progress towards implementing the Africa Energy Bank to finance major energy projects.

Digitalisation, skills development and local content are additional priorities.

The declaration supports secure digital platforms for data sharing, local content monitoring and joint research, alongside cross-border professional mobility and cooperation with training institutions.

It also promotes collaboration across exploration, production, refining, marketing and workforce development, while advocating a pragmatic energy transition that combines responsible hydrocarbon development with emerging green energy solutions.

Moagi said the agreement demonstrated participating countries' commitment to socioeconomic development. ■

Equatorial Guinea has fewer than seven blocks left

EQUATORIAL Guinea has fewer than seven exploration blocks remaining, down from more than 20 a year ago, as direct negotiations attract international investors, Minister of Mines, Hydrocarbons and Energy Antonio Oburu Ondo said.

The minister said the acreage has been taken up mainly by US and European companies, alongside some Asian investors.

Since May, the government has offered blocks through direct negotiations rather than licensing rounds, a policy that will continue until further notice.

Equatorial Guinea is also seeking investment to expand its Gas Mega Hub, which supplies gas from several fields, including the cross-border Yoyo-Yolanda resource shared with Cameroon, to the EG LNG plant at Punta Europa.

Oburu Ondo said opportunities include increasing LNG processing capacity and developing additional plants.

The minister identified mainland liquefied petroleum gas (LPG) storage as another priority, noting the country currently relies on a converted vessel for storage.

The EG-27 discovery also remains open to investors, with discussions continuing with ConocoPhillips on a non-exclusive basis.

Japan is exploring opportunities to diversify its energy supplies, with Yasuhiro Hashimoto, a senior adviser to Japan's Ministry of Economy, Trade and Industry, highlighting Africa's growing importance as a supply source.



Oburu Ondo ... US, European and Asian investors have taken up most blocks

He stressed that a stable business environment is essential to deeper investment cooperation.

Meanwhile, the US is pursuing partnerships with African downstream projects, particularly refining, according to Joshua Volz, Special Envoy for Global Energy Integration at the US Department of Energy.

Oburu Ondo said regulatory certainty and legal stability would be critical to sustaining investor confidence and retaining businesses.

The government will continue accepting bilateral offers for the remaining exploration blocks. ■

In Brief

Zambia exceeds 1,000 MW solar target

ZAMBIA has exceeded its 1,000 MW solar target for 2026, with capacity reaching 1,027 MW, President Hakainde Hichilema announced.

Total installed electricity capacity has risen to 4,722 MW from 3,777 MW in 2024.

The government aims to reach 10,000 MW by 2031, prioritising grid infrastructure and private investment.

Hichilema also called for stronger regional cooperation, while Zambia and Zimbabwe are developing an electricity interconnector to strengthen cross-border energy security and support economic growth.

Guinea-Bissau boosts climate resilience

GUINEA-BISSAU has launched the RESIslands initiative to strengthen climate risk assessments and develop investment proposals to protect vulnerable communities and ecosystems.

Funded by the Green Climate Fund and implemented by the UN Economic Commission for Africa, the 30-month programme supports nine African island states.

Guinea-Bissau has identified 10 preliminary project ideas covering coastal resilience, agriculture, water security, fisheries, early warning systems and renewable energy, subject to national validation and further development.

Lesotho targets universal power

LESOTHO aims to achieve universal electricity access by 2030 through the Mission 300 and Accelerating Sustainable and Clean Energy Access Transformation (ASCENT) programmes, Energy and Mining Minister Lejone Mpotjoane said.

The four-year, M800 million initiative is expected to benefit about 14,000 households through grid extensions, mini-grids and solar systems.

The government is also introducing a new contractor category for qualified young people to create employment opportunities while expanding electricity connections across the country.

Nigeria expands local solar production

NIGERIA'S Rural Electrification Agency plans annual procurement of 200 MW of locally manufactured solar panels and 200 MWh of battery storage products to boost domestic manufacturing and reduce imports.

The initiative could support local assembly and improve energy access, as more than 85 million Nigerians lack reliable grid electricity.

However, implementation depends on factory comwmissioning, quality certification, foreign-exchange availability and securing firm purchase commitments to attract financing.

Ghana targets gas-only power by 2027

GHANA expects to stop using imported liquid fuels for power generation by 2027, Energy Minister John Jinapor said, citing increased domestic gas use and imports from Nigeria.

The shift has saved about $500 million annually, while gas demand continues to grow. Senegal is targeting domestic gas supply of 150 million cubic feet per day by 2030.

Regional cooperation and cross-border infrastructure remain key to expanding Africa's gas markets and strengthening energy security. ■

Made in GCC 2026 boosts Gulf industrial ties

THE inaugural Made in GCC 2026 Forum and Exhibition concluded in Bahrain after three days of discussions, business engagements and industrial partnership announcements, attracting more than 10,500 registrations and over 120 exhibitors across more than 20,000 square metres.

Held at Exhibition World Bahrain from October 6-8, It brought together GCC industry and commerce ministers, the Gulf Cooperation Council secretary-general, government officials, manufacturers and investors.

The programme featured eight main sessions involving more than 30 speakers and experts, focusing on global market access, supply chain resilience, joint investment, smart manufacturing, innovation, sustainability, industrial finance and infrastructure development.

Several agreements, partnerships and industrial expansion plans were announced across energy, energy storage, automotive, batteries, logistics and sustainable manufacturing, alongside initiatives to expand exports and open new markets for Gulf products.

Bahrain's Minister of Industry and Commerce, Abdulla bin Adel Fakhro, said the inaugural edition had established a foundation for greater industrial integration and investment cooperation among GCC states.



Reem Batteries and UCA signing ceremony

He highlighted the region's resources, infrastructure, logistics networks, financial services and skilled workforce as assets that could strengthen regional value chains and improve the global competitiveness of Gulf products.

He also called for continued public-private sector cooperation, cross-border investment and greater emphasis on innovation and sustainable manufacturing.

Among the agreements announced, Oman's Reem Batteries & Power Appliances signed a memorandum of understanding with Bahrain's UCA to supply 18,000 batteries annually to the Bahraini market, with an estimated annual value of $1 million.

The agreement aims to strengthen trade links between Omani manufacturing and Bahraini businesses.

Bahrain-based Bapco Energies participated in the exhibition, showcasing specialised products and services from Bapco Manufacturing for the energy sector and related industries.

The company said its participation supported national manufacturing capabilities and opportunities for greater integration across the regional energy value chain.

Kuwait's EQUATE Group also participated at the invitation of the Public Authority for Industry, following its first-place recognition in the large industrial facilities category of the sixth edition of His Highness the Amir's Award for Distinguished Factories.

The petrochemical producer highlighted Kuwait's industrial capabilities and its international market presence.

Fakhro said Bahrain's hosting of the event reflected its commitment to Gulf economic cooperation, adding that the next phase would focus on building on the partnerships and investment opportunities generated. ■

Saudi Arabia to host Future Minerals Forum

SAUDI Arabia will host the sixth edition of the Future Minerals Forum (FMF) from January 12 to 14, 2027, in Riyadh.

Held under the theme "Global Collaboration for Resilient Mineral Supply Chains," FMF 2027 will focus on mobilising investment, accelerating mining project development and expanding mineral supply chains in Saudi Arabia and emerging supplier regions across Africa, West and Central Asia, and Latin America.

The forum's fifth edition, held in January 2026, attracted 21,500 participants from 175 countries, alongside senior government representatives from 91 countries and more than 64 governmental and non-governmental organisations.

It resulted in 132 agreements and memoranda of understanding worth more than $26.7 billion, bringing the cumulative total across five editions to 398 agreements valued at over $75.2 billion.



FMF will feature a ministerial roundtable on mineral cooperation

The 2027 programme will feature a ministerial roundtable bringing together government officials, industry leaders, financial institutions and other stakeholders to advance cooperation across the minerals value chain.

Expanded investment activities will connect investors with projects and financing opportunities, while sector outlook sessions will examine commodity markets and emerging trends.

The announcement comes amid significant growth in Saudi Arabia's mining sector. Exploration expenditure rose from $54.7 million in 2020 to a record $362.7 million in 2025, while the number of active exploration companies increased from six to 191.

Saudi Arabia has also reported estimated resources of 114 million tonnes of ore containing high concentrations of rare earth elements, particularly heavy rare earth elements, at the Jabal Sayid project in the Madinah Region, alongside promising uranium concentrations. ■

World Utilities Congress set for May 2027

THE World Utilities Congress will return to Abu Dhabi from May 25 to 27, 2027, hosted by TAQA, bringing together global leaders to advance investment, technology and partnerships across the power and water sectors.

The event will provide a platform for policymakers, utility operators, investors, developers and technology providers to address rising electricity and water demand, infrastructure challenges and the need for more secure, resilient and affordable utility systems.

The congress is expected to attract more than 25,000 exhibition attendees, 250 global exhibitors and 1,000 conference delegates.

Its programme will feature over 500 expert speakers and more than 120 conference sessions.

Discussions will focus on infrastructure investment, energy security, grid modernisation, water security, supply chain resilience, regional interconnection and sustainable technologies.

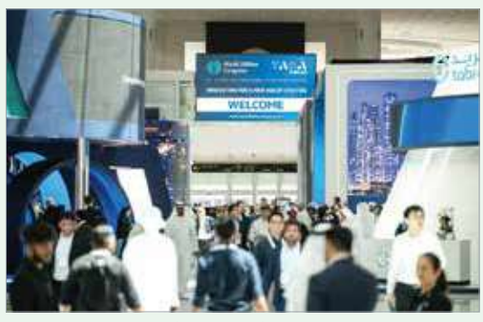
The programme will also examine the role of digitalisation and artificial intelligence in improving utility operations and infrastructure performance.

The strategic conference will bring together ministers, chief executives and policymakers to explore investment priorities, system reliability, affordability, decarbonisation and regional cooperation.

Meanwhile, the technical conference will showcase engineering practices, operational solutions and case studies aimed at improving efficiency and strengthening power and water networks.

The exhibition will connect solution providers with utilities, government entities, regulators, investors and project developers, creating opportunities to explore new technologies, establish commercial relationships and identify potential projects.

Organisers said the congress aims to bridge policy and investment priorities with practical implementation, helping stakeholders accelerate infrastructure development and deliver integrated solutions across the utilities value chain. ■



The congress aims to drive power and water investment

Abu Dhabi summit to spotlight sustainable development

THE World Future Energy Summit will bring together global industry leaders, policymakers, investors and technology experts to accelerate the energy transition.

Hosted by Masdar as part of Abu Dhabi Sustainability Week (ADSW), the three-day event will take place at ADNEC Centre Abu Dhabi from January 12 to 14, 2027, serving as a platform for investment, innovation and collaboration across renewable energy and sustainable development.

With the Middle East expected to invest more than $75 billion in clean energy, the summit aims to facilitate strategic partnerships, unlock commercial opportunities and encourage dialogue on solutions that support long-term economic growth and a more sustainable future.



World Future Energy Summit aims to turn clean energy targets into action

Spanning nearly two decades, the summit has established itself as a meeting point for stakeholders shaping the future of energy systems, smart infrastructure and climate innovation.

Its programme covers key sectors, including renewable energy, hydrogen, water, energy storage, artificial intelligence and climate technologies, alongside discussions on energy resilience, sustainable growth and net-zero ambitions.

The 2027 edition will provide opportunities for participants to connect with government representatives, utilities, project owners, investors and industry pioneers, while gaining insights into the policies, technologies and investments influencing energy markets across the Middle East and beyond.

Previous event figures highlighted by the organisers include more than 51,000 attendees, over 420 VIP visits, $3 billion in business value and 302 thought leaders, underscoring the summit's role in facilitating industry engagement and commercial collaboration. ■

Egypt Mining Forum drives investment



The forum sought investment and greater value from mineral wealth

EGYPT Mining Forum 2026 concluded in Cairo following its largest edition, attracting more than 6,000 participants from over 50 countries to discuss exploration, investment and the development of Egypt's mining sector.

Held under the patronage of President Abdel Fattah El Sisi, who inaugurated the event on September 28, the fifth edition was hosted by the Ministry of Petroleum and Mineral Resources, with support from the Mineral Resources and Mining Industries Authority (MRMIA).

The forum featured more than 500 conference delegates, 100 speakers and 100 exhibiting companies.

Petroleum and Mineral Resources Minister Karim Badawi outlined reforms aimed at attracting exploration investment, improving licensing and permitting, and accelerating projects from discovery to production.

Egypt aims to increase mining's contribution to around 6 per cent of gross domestic product (GDP), with greater emphasis on processing and downstream value creation.

The Open Blocks system attracted 119 companies and 403 offers across 118 mining blocks during its first three months, highlighting renewed exploration interest.

Discussions also examined critical minerals, resilient supply chains and the potential of the Arabian-Nubian Shield.

Gold exploration remained a priority, with AngloGold Ashanti indicating plans to expand its Egyptian activities. Participants stressed responsible production, refining and stronger local supply chains.

The launch of the African Minerals Regulatory Authorities Forum (AFMRA) in Cairo further advanced regional cooperation.

The forum concluded with calls to strengthen investor confidence, accelerate discoveries and generate greater economic value from Egypt's mineral resources. ■

Oman leaders explore future of automation

MULTIVISTA Oman and Rockwell Automation hosted the fourth edition of Partnering for Success (PFS) on September 14, 2026, at the Grand Millennium Hotel Muscat, bringing together around 125 industry representatives to discuss industrial automation, operational efficiency and local expertise under the theme "Creating the Future of Industrial Operations".

The event attracted end users, original equipment manufacturers (OEMs), system integrators and government representatives, including Khalid Al-Qassabi, Director General of Industry at the Ministry of Commerce, Industry and Investment Promotion (MoCIIP).

Discussions highlighted the role of technology partnerships in supporting Oman Vision 2040 and strengthening the Sultanate's industrial sector.

A key session featured Sohar Aluminium representatives Ibrahim Al Maawali, Automation Superintendent, and Nader Al Zadjali, Senior Automation Engineer, who shared insights into managing automation in continuous-process industrial environments.

They highlighted the benefits of standardised automation platforms in simplifying maintenance, supporting local engineering skills and ensuring consistent operations.

Rockwell Automation was represented by Rohit Khera, Vice President, Global Market Access, and Mark Bottomley, Regional Vice President, Regional Market Access, EMEA, alongside product specialists and industry experts.

The programme also featured demonstrations by Multivista Oman's system integrator partners, Delta International Projects & Engineering, Optimal Systems & Trading and SGH Energy Systems, showcasing local capabilities in designing, implementing and supporting advanced automation solutions.

In-Country Value (ICV) was a central theme, with discussions focusing on developing local skills, strengthening domestic capabilities and retaining economic value within Oman. ■



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Expo News

Middle East Gas Conference to focus on energy security

THE Middle East Gas Conference 2026 will bring together industry leaders to discuss investment, infrastructure development and regional cooperation to strengthen gas security.

The event will take place on November 18 at the Waldorf Astoria DIFC in Dubai, UAE.

Held under the theme "Powering Progress Through Partnership: Advancing Gas Infrastructure Across the Middle East," the conference will examine strategies for developing integrated gas networks as regional demand rises and global energy systems evolve.

The programme will feature senior executives from national and international energy companies, investors, technology providers and industry experts, focusing on exploration, production, financing and cross-border infrastructure development.



Credit: ABCDstock/ Shutterstock

Key speakers include Majid Jafar, Chief Executive Officer of Crescent Petroleum; Fatema Al-Nuaimi, Chief Executive Officer of ADNOC Gas; and Fakher Bader, Shell's Iraq, UAE and Libya Country Chairman.

Other speakers include Neeraj Agrawal, Crescent Petroleum's Group Chief Financial Officer, and Charif Souki, Chairman of Ajax Holdings.

Sessions will address emerging gas opportunities, including tight gas exploration, financing major infrastructure projects, Iraq's gas future and the expansion of midstream networks.

Discussions will also explore cross-border partnerships and strategies to build a more connected regional gas market.

The conference aims to identify practical investment and collaboration opportunities to support long-term energy security and develop a resilient Middle Eastern gas sector. ■

People

LR appoints Mideast Naval Director



Lloyd's Register (LR) has appointed Hossam Edris as Naval Business Director for the Middle East.

Based in Dubai, Edris brings over 20 years of international experience across aerospace, defence, aviation and technology sectors.

New CEO at Blackline Safety



Blackline Safety has appointed Jon Baldwin as Chief Executive Officer (CEO).

Baldwin brings over 20 years of leadership experience in connected technology, sensing and hardware, having held senior positions at Verra Mobility, Fortive, Tektronix, Texas Instruments and Analog Devices.

GEF names CEO, Chairperson

Diego Mesa Puyo has begun his four-year term as CEO and Chairperson of the Global Environment Facility (GEF).



The Colombian-Canadian economist previously served as Colombia's Energy Minister and held a senior role at the International Monetary Fund.

Perpetual Next adds Board Member



Perpetual Next has appointed Jacqueline Vaessen to its Supervisory Board.

Vaessen brings extensive expertise in the Dutch chemical industry, energy transition, sustainable innovation and circular materials development.

Dacke Industri selects BTL-UK CEO



Dacke Industri has appointed Caroline Taylor as CEO of its UK subsidiary, BTL-UK.

Taylor has nearly 16 years of experience at the company, most recently serving as general manager, overseeing daily operations.

Calendar of Events



NOVEMBER 2026

2-5 ADIPEC
Abu Dhabi, UAE
https://www.adipec.com/

2-5
Saudi Elenex
Riyadh, KSA
https://saudielenex.com/

4-5 Clean Energy Transition Asia (CETA)
Kuala Lumpur, Malaysia
https://ceta.asia/

16-17 Misurata Energy & Business Summit
Tripoli, Libya
https://www.in-vr.co/misurata/energy-business-summit

16-18 LNG Bunkering Summit
Orlando, Florida, US
https://www.oilandgasiq.com/events-lngbunkeringna

17 Namibia Asset Integrity, Maintenance, Corrosion & Turnaround (AIMCT) Conference
Windhoek, Namibia
https://conferencescs.com/events/upcoming-physical-events/aimct-namibia/

17-19 10th Biomass & BioEnergy Asia
Ho Chi Minh City, Vietnam
https://www.cmtevents.com/aboutevent.aspx?ev=261120&

18 Middle East Gas Conference
Dubai, UAE
https://web.cvent.com/event/2bcf4cfa-e4f1-4da9-a3ac-c3ac49fefe34/summary

24 South Africa Tank Integrity & Terminal Summit
Durban, South Africa
https://conferencescs.com/events/upcoming-physical-events/tanks-africa/

24-26 World Utilities Congress
Abu Dhabi, UAE
https://www.worldutilitiescongress.com/

DECEMBER

1-3 Black Hat Mea
Riyadh, KSA
https://blackhatmea.com/

1-3 Methan Mitigation America
Houston, Texas, US
https://www.industrialdecarbonizationnetwork.com/events-methane-mitigation-america

1-4 World LNG Summit & Awards
Istanbul, Türkiye
https://www.worldlngsummit.com/

9-10 Global Sustainable Islands Summit - GSIS 2026
Hamburg, Germany
https://www.gsis-hamburg.com/

JANUARY 2027

12-14 World Future Energy Summit (WFES)
Abu Dhabi, UAE
https://www.worldfutureenergysummit.com/

Company News

Devon Energy sells Eagle Ford assets for $4.2bn

DEVON Energy has agreed to sell its Eagle Ford assets in Texas to Crescent Energy Company for $4.2 billion in cash, subject to customary closing adjustments.

The assets cover approximately 90,000 net acres across Karnes, DeWitt and Gonzales counties, representing around 4 per cent of Devon's total production.

The transaction has an effective date of July 1, 2026, and is expected to close around year-end, subject to regulatory approvals and customary closing conditions.

The divestiture forms part of Devon's portfolio optimisation strategy, aimed at prioritising higher-return, longer-duration assets and improving capital efficiency.

The sale is expected to extend inventory life, lower the company's corporate breakeven and reduce its base production decline rate.

Devon plans to use the after-tax proceeds to accelerate share repurchases and reduce debt, strengthening its balance sheet and supporting shareholder returns.

The company said the agreed valuation reflects the assets' production and inventory value and is accretive to free cash flow and net asset value per share. ■

Xcel Energy to exit Michigan operations

XCEL Energy has agreed to sell its natural gas operations in Michigan to SEMCO ENERGY Gas Company and its electric operations to Upper Peninsula Power Company (UPPCO), subject to state and federal regulatory approvals.

The transaction will transfer approximately 6,000 natural gas customers to SEMCO and 9,000 electricity customers to UPPCO across Gogebic and Ontonagon counties in Michigan's Upper Peninsula.

The companies expect the deal to close in 2027.

The sale is intended to place customers with utilities focused on serving Michigan and the Upper Peninsula, leveraging their regional experience and local infrastructure investments.

Customer service is expected to continue without interruption during the transition.

There will be no immediate changes to billing, rates or customer service processes, and customers will receive advance notice of any future changes.

The companies will work with regulators, employees and community stakeholders to coordinate the transition. ■

Energy Transfer to buy Vaquero Midstream for $2.63bn



ENERGY Transfer agreed to acquire Vaquero Midstream in a transaction valued at $2.625 billion, expanding its natural gas infrastructure in the Permian Basin.

The deal comprises $1.95 billion in cash and 33.3 million newly issued common units.

Vaquero's assets include a 300-mile pipeline network, three processing trains and total processing capacity of 675 million cubic feet per day in the southern Delaware Basin.

The system is supported by 100,000 dedicated acres and contracts with an average remaining term of 10 years.

Energy Transfer expects the acquisition to immediately increase distributable cash flow per common unit.

Completion is targeted for the fourth quarter of 2026, subject to regulatory approval and customary closing conditions.

The transaction follows strong second-quarter results, with revenue rising 78.4 per cent year-on-year to $34.33 billion.

Diluted earnings per share reached $0.59, exceeding the consensus estimate of $0.38. ■

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ADNOC Offshore – P5 Production Increase Plan – Upper Zakum Facilities Expansion

Name of Client : ADNOC Offshore
Budget : $825,000,000
Contract Value : $825,000,000
Facility Types : Development Drilling and Production
Field Type : Brownfield
Sectors : Exploration and Upstream Production, Offshore
Main Contractor : Wood
Location : Upper Zakum, Offshore Abu Dhabi, UAE
EPC Award : Q2 – 2024

PROJECT BACKGROUND

ADNOC plans to expand the Upper Zakum offshore oilfield, located 84 kilometres off Abu Dhabi, to increase production capacity to 1.2 million barrels per day under the first phase of the UZ1000 project. The expansion forms a key component of ADNOC Group's P5 Production Increase Plan.

PROJECT SCOPE

The Upper Zakum offshore oil field development project involves expanding and upgrading facilities across four artificial islands: Al-Ghallan, Umm Al-Anbar, Ettouk and Asseifiya.

The engineering, procurement and construction (EPC) scope includes production facilities, gas-compression systems, water-injection plants, produced-water treatment and disposal systems,



pumps, pipelines and electrical substations. The project will also debottleneck water-injection facilities at the Zakum Central Complex.

Additional works include installing power cables and pipelines between Umm Al-Anbar and Zirku Island, alongside associated infrastructure.

The wider development aims to modernise Upper Zakum's operations through artificial intelligence-enabled remote operations and electricity supplied by the UAE's clean energy grid to reduce emissions. The use of artificial islands for drilling is also intended to enhance environmental protection.

The upgrades are designed to strengthen production infrastructure, improve operational efficiency and support more sustainable offshore oilfield operations.

PROJECT STATUS

As of September 2026, construction on the $825 million project is ongoing. Construction and modular fabrication are actively progressing. Commissioning and completion are scheduled for 2027.

PROJECT FINANCE

Abu Dhabi National Oil Company (ADNOC) Offshore is the client and operator of the project. The Upper Zakum oil field is jointly owned by three stakeholders, with ADNOC holding a 60 per cent stake, ExxonMobil owning 28 per cent, and Japan Oil Development Company (JODCO), a wholly owned subsidiary of INPEX, holding the remaining 12 per cent.

PROJECT TIMELINE

Feasibility Study : Q1 – 2019
FEED : Q2 – 2019
PMC ITB : Q4 – 2019
PMC : Q2 – 2020
EPC ITB : Q2 – 2023
EP : Q2 – 2024
Construction : Q2 – 2024
Commissioning : Q1 – 2027
Completion : Q1 – 2027

PROJECT WATCH – UAE

Project Name	Facility	US$ Million	Status
P5 Production Increase Plan - Umm Shaif Long Term Development - Phase 1 - Wellhead Towers & Subsea Pipelines	Development Drilling & Production	$1,000,000,000	Commissioning
Production Increase Plan - Nasr-115 Expansion	"Development Drilling & Production Oil Field"	$1,000,000,000	Engineering & Procurement
AI-Powered Well Digitalization Programme	"Gas Field Oil Field"	$920,000,000	Construction
Al Dhafra Petroleum - Haliba Oil Field - Overview	Development Drilling & Production	$1,350,000,000	Construction
Al Yasat Petroleum - P5 Production Increase Plan - Belbazem Oil Field Development	"Development Drilling & Production Oil Field"	$1,000,000,000	Commissioning
Asab 1 & 2 Capacity Enhancement	Gas Processing	$1,500,000,000	Construction
Atlas Industries - KIZAD Biomass Refinery	"Biofuels Refinery"	$1,000,000,000	Construction
Bab Gas Cap Development	Gas Field	$4,000,000,000	EPC ITB
Bab Sour Gas Field Development	Gas Processing	$10,000,000,000	EPC ITB
Dalma Gas Development (DGD) - Onshore Package - Gas Dehydration Facilities	Gas Field	$1,100,000,000	Construction
Dalma Gas Development (DGD) - Overview	Gas Field	$2,000,000,000	Construction
DUSUP - Jebel Ali Gas Reservoir Project	Gas Field	$15,000,000,000	EPC ITB
Ghasha Concession Deep Gas Project	Gas Field	$1,200,000,000	PMC
Hail and Ghasha Megaproject - Overview	Gas Field	$18,000,000,000	Construction
Hassyan Ultra-Supercritical Gas Power Plant - Phase 2 - 1,200 MW	Gas-fired Power Plant	$1,700,000,000	FEED
Oxy - Abu Dhabi Onshore Block 3	Oil Field	$1,000,000,000	Construction
P5 Production Increase Plan - Bab Artificial Lift Wells - Phase 2 - Modification of Wells	"Development Drilling & Production Oil Field"	$1,000,000,000	Construction
P5 Production Increase Plan - Habshan 5 Complex LPP, Compression Facilities, and Transmission Pipelines - LNG (LPP)	Liquefied Natural Gas (LNG)	$1,300,000,000	Construction
P5 Production Increase Plan - Lower Zakum Long Term Development Plan - Overview	Development Drilling & Production	$8,000,000,000	Construction
P5 Production Increase Plan - Lower Zakum Long Term Development Plan - Phase 1 (LTDP-1) - Main Gas Pipeline - Overview	Development Drilling & Production	$3,000,000,000	Construction
P5 Production Increase Plan - Lower Zakum Long Term Development Plan - Package 4 - Offshore Wellhead Towers & Pipelines	"Offshore Platform Rig Well head"	$3,000,000,000	Construction
P5 Production Increase Plan - North East Bab Onshore Oilfield Expansion - Off-Plot Facilities	Oil Field Development	$1,700,000,000	EPC ITB
P5 Production Increase Plan - Replacement of Flowlines & Wellheads Installation - Overview	"Seamless Gas Field Oil Field"	$1,500,000,000	Construction
P5 Production Increase Plan - Rich Gas Development (Project 5.0) - Overview	Development Drilling & Production	$14,000,000,000	Construction
P5 Production Increase Plan - Rich Gas Development (RGD) - Phase 1 - Gas Asset Optimization & New Streams - Das Island Liquefaction Facility	Natural Gas Liquefaction (NGL)	$1,200,000,000	Construction
P5 Production Increase Plan - Rich Gas Development (RGD) - Phase 1 - Gas Asset Optimization & New Streams - Habshan Facility	Gas Compression	$2,800,000,000	Construction
P5 Production Increase Plan - Rich Gas Development (RGD) - Phase 2 - Habshan 7 New Gas Train (H7 NGT)	Gas Processing	$1,100,000,000	Construction
P5 Production Increase Plan - South East and North East Bab Assets - Overview	"Development Drilling & Production Oil Field"	$3,000,000,000	Construction
P5 Production Increase Plan - Umm Shaif Long Term Development - Phase 2 - Drilling & Processing Facilities	Development Drilling & Production	$3,000,000,000	Construction
P5 Production Increase Plan - Upper Zakum Facilities Expansion - UZ 1.5 MMBD	Oil Field	$10,000,000,000	Engineering & Procurement

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