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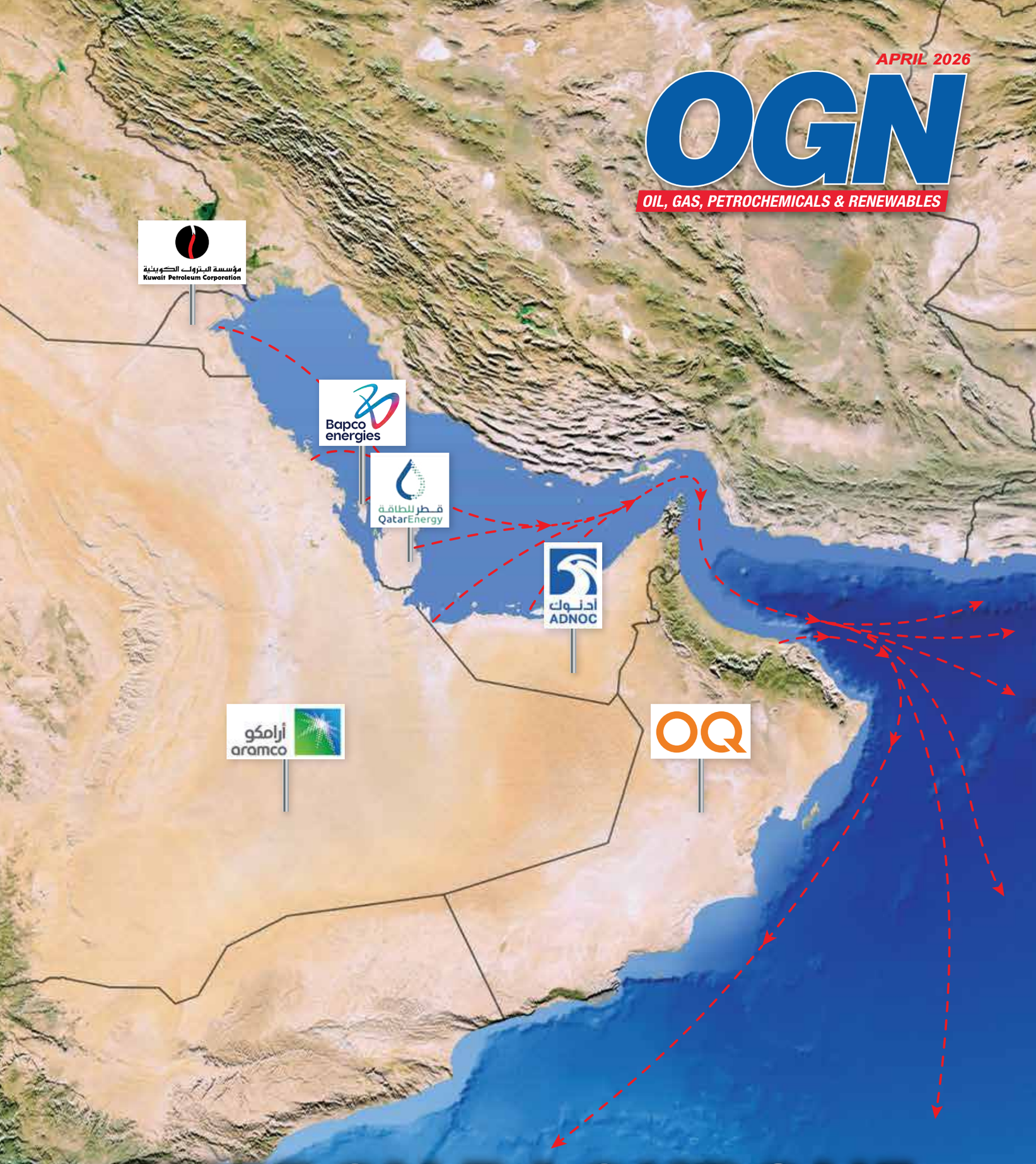

ENERGY BACKBONE

GCC Dominance and War's Impact

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■ Industry Trends ■ Industry Leader Interview


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HORMUZ STRAIT SHUTDOWN SPARKS GLOBAL ENERGY SHOCK

BY ABDULAZIZ KHATTAK

Disruption in Gulf shipping lanes imperils oil supply and global growth

THE Strait of Hormuz, a 33-39 km-wide waterway at its tightest point, through which roughly 20 million barrels per day (bpd) of crude transit (about 20 per cent of global oil consumption), has ceased normal maritime throughput as geopolitical conflict escalates.

With tanker traffic curtailed to a trickle and insurers repricing risk aggressively, the corridor's closure has removed an estimated 9 million bpd from global supply, driving Brent crude to surge by more than 50 per cent in March and prompting options markets to signal a non trivial probability of prices near $150 per barrel or higher.

War risk insurance premiums for vessels in the region have jumped sharply, with market reports noting increases to 5-10 per cent of a ship's insured value, up from fractions of a per cent in peacetime.

This escalation has pushed freight costs on key Middle East routes to figures equivalent to more than $400,000 per day, effectively pricing many operators out of transit and forcing cargoes to reroute around the Cape of Good Hope, adding weeks to voyages and materially increasing delivered cost.

Hydrocarbons from the Gulf are integrated into global supply chains

Analysts have projected that a sustained closure lasting two quarters could lift oil to average $115 per barrel and depress global GDP growth by around 0.3 percentage points in 2026, with impacts growing if the disruption persists.

Beyond oil, the bottleneck threatens LNG and petrochemical flows, with Asia, the destination for roughly 80 per cent of Gulf exports, facing acute supply and price pressures.

The combined effect on energy costs, inflation and global trade underscores that a closed Hormuz is not a regional problem but a structural shock to the world economy. ■

Read full analysis on Page 34

Closure of Hormuz Strait is 'economic terrorism'

WEAPONISING the Strait of Hormuz is an act of economic terrorism with global impact far beyond energy markets, Dr Sultan Ahmed Al Jaber, UAE Minister of Industry and Advanced Technology and ADNOC Managing Director and Group CEO, told CERAWeek in Houston, Texas.

"When Hormuz is squeezed, the pressure is immediately felt around the world. In just three weeks, the price of oil has risen by 50 per cent. This is raising the cost of living for those who can least afford it and slowing economic growth everywhere. From factories, to farms, to families around the world, the human cost is mounting by the day," Dr Al Jaber said.

"So let me be absolutely clear. Weaponising the Strait of Hormuz is not an act of aggression against one nation. It is economic terrorism against every nation.

"And while we appreciate all efforts to stabilise markets and reduce prices, this is not a supply issue. It is a security issue, and it has only one durable answer, keeping the Strait open. We cannot trade our way out of this crisis." ■

GCC energy crucial for global markets, economies

GCC states, which include Saudi Arabia, the UAE, Kuwait, Qatar, Bahrain and Oman, remain pivotal to the global energy system, producing 21.8 per cent of global crude oil and 26.6 per cent of exports in 2024

Output averaged 16.1 million barrels per day (bpd) and exports 11.5 million bpd, down 5.4 per cent and 7.2 per cent from 2023.

The region controls 511.9 billion barrels of oil reserves, equivalent to 32.7 per cent of the global total, and 44.3 trillion cu m of natural gas, or 21.2 per cent worldwide.

GCC natural gas output contributed 10 per cent of worldwide production, with exports at 13.5 per cent.

Supply flows are heavily concentrated toward Asia, particularly China, India, Japan and South Korea, yet market effects are global due to oil's benchmark pricing.

OPEC+ coordination, where Saudi Arabia and the UAE exert decisive influence, allows rapid adjustment of production, supporting prices during downturns or easing tightness.

Qatar's LNG infrastructure anchors long-term contracts while engaging in spot markets affecting European and Asian pricing.

Even a one million bpd production shift can materially affect global balances.

GCC reserves and export infrastructure, combined with coordinated policy measures, secure the region's structural influence on energy markets.

Hydrocarbon flows from the Gulf are integrated into worldwide supply chains, underpinning industrial activity, transportation, electricity generation, and manufacturing costs across continents. ■

Read full analysis on Page 36

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At 7 kgCO2eboe, ADNOC has one of the lowest upstream carbon intensities in the world

ADNOC ACCELERATES GLOBAL EXPANSION STRATEGY THROUGH STRATEGIC MERGERS

The company is transitioning into a diversified global energy conglomerate by integrating international downstream assets and deploying advanced industrial artificial intelligence across its entire production value chain

BY ABDULAZIZ KHATTAK

THE Abu Dhabi National Oil Company (ADNOC) has successfully transitioned from a traditional upstream producer into a vertically integrated global energy conglomerate, a shift that provides significant commercial and strategic insulation amidst the current US-Iran conflict.

As regional maritime stability faces pressure, ADNOC's integrated infrastructure, most notably the 1.5 million barrel per day (bpd) Habshan-Fujairah pipeline, serves as a critical hedge, allowing the group to bypass the Strait of Hormuz and maintain uninterrupted deliveries to international markets.

This operational resilience is matched by a $150-billion 2026-30 capital expenditure plan designed to capture value across the entire energy chain, from high-margin gas production to international chemicals.

A central pillar of this diversification is the March 2026 consolidation of Borouge and Borealis under the XRG investment vehicle, a move that establishes ADNOC as the fourth-largest polyolefins producer globally with an enterprise value exceeding $150 billion.

By centralising these international downstream assets, the group has effectively transformed its revenue model, ensuring that Abu Dhabi's hydrocarbon reserves are monetised deep into the global manufacturing sector.

This financial framework is further bolstered by the performance of ADNOC Gas and ADNOC Logistics and Services (ADNOC L&S), which together target $43 billion in dividend distributions through the end of the decade.

These returns support the massive infrastructure requirements of the Hail and Ghasha net-zero gas projects, which are essential for domes-

tic gas self-sufficiency and the expansion of the UAE's liquefied natural gas (LNG) export capacity.

The Ghasha development, in particular, is engineered to operate with a net-zero carbon footprint from inception by integrating advanced carbon capture and sequestration technologies.

This end-to-end control, managed by the maritime and logistics arm ADNOC L&S, ensures that the group retains full oversight of product delivery, reinforcing the UAE's status as a reliable energy partner despite the prevailing geopolitical sensitivities in the Middle East.

AI INTEGRATION & OPERATIONAL EFFICIENCY DATA

The deployment of the ENERGYai platform across ADNOC's upstream and downstream operations has transitioned from a pilot phase to a core driver of institutional margin improvement.

In the preceding fiscal year, artificial intelligence (AI) and machine learning (ML) solutions generated approximately $500 million in quantifiable value by optimising drilling parameters and reducing unplanned maintenance cycles across the group's ageing assets.

The AI Ruwais refinery complex has seen a significant reduction in energy intensity through the application of predictive analytics, which adjusts process heaters in real-time based on ambient temperature and feedstock quality.

This technical evolution is most visible in the SARB Deep Gas Development, where the Final Investment Decision reached in January 2026 paving the way for a facility designed entirely around remote operations and digital twin technology.

By utilising the AramcoMetaBrain model and localised industrial AI variants, ADNOC engineers can simulate reservoir behaviour with unprecedented precision, allowing for a 15 per cent increase in recovery rates from complex carbonate structures.

The integration of these technologies is not merely a matter of operational convenience but a financial necessity as the group seeks to maintain its status as one of the world's lowest-cost producers.

While ADNOC maintains some of the world's lowest financial lifting costs, the transition toward hyper-low carbon intensity (measured in kgCO2e/boe) demands a level of high-frequency, granular data analytics that legacy supervisory control systems are unable to support.

ADNOC has maintained an upstream carbon intensity of 7 kgCO2e/boe. For context, the global industry average typically ranges between 15 and 22 kgCO2e/boe, placing ADNOC in the 'top tier' of low-intensity producers.

At the Shah gas plant, the application of AI-driven leak detection and repair protocols has contributed to a record-breaking methane intensity of 0.1 kgCO2e/boe, placing the facility at the vanguard of global environmental performance metrics.

Furthermore, the use of autonomous drones for pipeline inspection has reduced the need for manned helicopter sorties, lowering both operational expenditure and the overall safety risk profile of the midstream sector.

The financial markets have responded to this digital transformation with increased confidence, as evidenced by the oversubscription of recent bond issuances earmarked for technology upgrades.

Investors increasingly view ADNOC not as a traditional national oil company but as a "Tech-Oil" entity capable of delivering silicon-valley-style efficiency gains within a heavy industrial context.

The data generated by these systems is now being fed back into the XRG investment arm to inform future chemical plant designs, ensuring that every new asset added to the global portfolio is "digital-native" from the day of commissioning.

This feedback loop between operational data and capital expenditure is a defining characteristic of the group's 2026 strategy, allowing for the rapid scaling of successful innovations across multiple continents and disparate asset classes.

DECARBONISATION TARGETS & HYDROGEN ECONOMY

ADNOC has accelerated its timeline for reaching net-zero operational emissions to 2045, making it the first of its regional peers to commit to such an accelerated schedule.

This target is supported by a multi-pillar strategy that prioritises large-scale carbon capture and storage (CCS) alongside the development of a regional hydrogen hub.

The Habshan CCS project, one of the largest in the Middle East, is currently being expanded to increase its capacity to 5 million tonnes of CO2 per annum by 2030.

This captured carbon is primarily utilised for enhanced oil recovery in mature fields, thereby sequestering the gas while simultaneously boosting production efficiency.

The move toward a hydrogen-based economy is evidenced by the construction of a world-scale blue ammonia production facility in Ruwais, which leverages the group's existing gas processing infrastructure and CCS capabilities.

By converting natural gas into hydrogen and capturing the associated CO2, ADNOC is positioning itself to supply the growing demand for low-carbon fuels in the maritime and power generation sectors.

The recent partnership with Japanese and Korean utilities for the long-term supply of blue ammonia underscores the commercial viability of this pathway.

These agreements are structured around 15-year terms, providing the price certainty required to de-risk the massive capital outlays associated with hydrogen liquefaction and transport.

In tandem with these industrial shifts, ADNOC is also investing in direct air capture (DAC) technologies through pilot projects that seek to prove the scalability of atmospheric carbon removal in arid environments.

While still in the early stages of commercialisation, DAC is viewed as a critical tool for addressing hard-to-abate emissions within the group's international shipping fleet.

The expansion of the Al Reyadah carbon capture network to include third-party industrial emitters in the country further demonstrates ADNOC's role as a regional anchor for decarbonisation infrastructure.

By providing a centralised CO2 transport and storage service, the group enables other heavy industries, such as cement and steel manufacturing, to reduce their environmental footprints in line with national climate objectives.

This holistic approach to carbon management is integrated into the group's broader financial reporting, with green financing frameworks now linked to specific emission reduction milestones.

The transparency provided by these frameworks has allowed ADNOC to tap into a broader pool of ESG-focused capital, which was previously hesitant to engage with the hydrocarbon sector.

As the energy transition progresses, the ability to produce "lower-carbon" oil and gas will become a significant competitive advantage, as carbon border adjustment mechanisms in major markets like the European Union (EU) begin to penalise high-intensity imports.

ADNOC's focus on maintaining a low-carbon intensity per barrel is, therefore, a strategic hedge against future regulatory shifts and evolving consumer preferences.

The integration of renewable energy into the group's power mix, primarily through the supply of nuclear and solar energy from the national grid, has already eliminated a substantial portion of Scope 2 emissions.

This transition to clean power for onshore operations allows the group to reserve its natural gas for high-value exports and as a feedstock for the expanding petrochemical sector.

The synergy between traditional hydrocarbon extraction and modern environmental engineering is the cornerstone of the ADNOC 2026 outlook, ensuring that the company remains relevant in a world increasingly defined by the dual demand for energy security and climate action.

The scale of the Hail and Ghasha projects, combined with the global reach of XRG and the technical sophistication of the ENERGYai platform, represents a comprehensive retooling of the Abu Dhabi energy model for the mid-21st century.

As these projects move from construction into full-scale operation, the resulting data will likely set new benchmarks for the global industry in terms of both profitability and environmental stewardship.

The group's ability to execute this complex, multi-front strategy will be the primary metric by which its leadership is judged in the coming years. ■

ADNOC L&S strengthens resilience amid global expansion, volatility

Robust revenues, global fleet expansion, and AI-enabled operations reinforce the company's ability to support energy flows amid increasingly complex and volatile market conditions worldwide

ADNOC Logistics & Services (ADNOC L&S) delivered a year of accelerated growth in 2025 while reinforcing the operational resilience of its integrated maritime logistics platform, positioning the business to sustain performance amid increasingly complex global market conditions.

Revenue rose 41 per cent year-on-year to $5.02 billion, with EBITDA increasing 32 per cent to $1.51 billion at a margin of 30 per cent, and net profit reaching $863 million.

The scale of this performance reflects not only expansion across core segments, but also the strengthening of a model built around reliability, utilisation efficiency, and diversified operations.

According to the company's 2025 annual report, this performance is anchored by a high proportion of long-term contracted revenues, with more than 60 per cent of income secured under multi-year agreements and approximately $25 billion in forward-contracted revenue providing sustained visibility over future earnings.

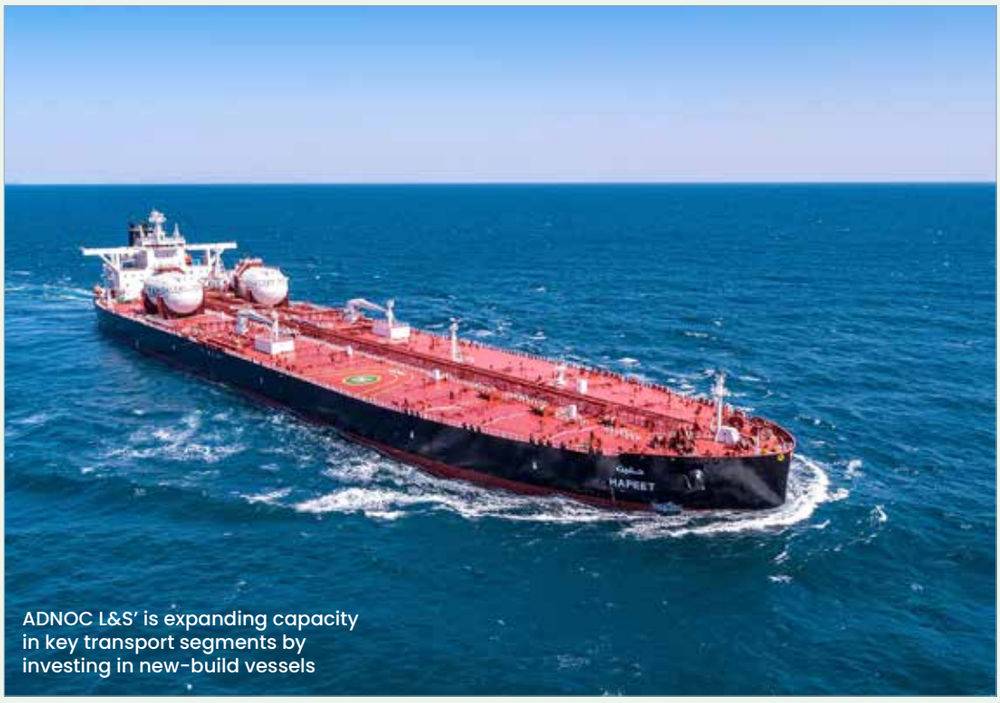
A central development in 2025 was the integration of Navig8, in which ADNOC L&S acquired an 80 per cent stake, adding 32 tankers and significantly extending its global operational footprint. The acquisition expanded the company's presence to offices in 19 cities and strengthened its commercial capabilities across shipping pools, bunkering, and vessel management.

As a result, ADNOC L&S now operates and charters more than 600 vessels, reinforcing its position as the second-largest integrated maritime logistics provider in the energy sector by market capitalisation.

Segmental performance reflected both scale and diversification. Shipping revenues increased by 122 per cent year-on-year to $2.1 billion, driven by fleet expansion and the integration of Navig8's assets and systems.

Integrated Logistics generated $2.5 billion in revenue, up 11 per cent, supported by higher offshore activity, improved vessel utilisation, and the delivery of major engineering, procurement and construction projects.

The Services segment contributed $362 million, an increase of 16 per cent, reflecting higher port throughput and the deepening of long-term partnerships.



ADNOC L&S' is expanding capacity in key transport segments by investing in new-build vessels

BUILDING RESILIENCE ACROSS A GLOBAL ENERGY LOGISTICS NETWORK

ADNOC L&S's operations now extend across more than 50 countries, serving over 100 energy sector customers through a fully integrated model spanning shipping, offshore logistics, and onshore services.

The company's global expansion is closely aligned with ADNOC's broader growth trajectory, with logistics capacity scaled to support increased production, trading activity, and international market engagement.

Investments in new-build vessels, including LNG carriers and very large ethane carriers, are designed to enhance fleet efficiency while expanding capacity in key transport segments.

These additions are complemented by long-term infrastructure commitments that extend the company's role beyond transportation into integrated industrial logistics.

Among these are a 50-year agreement to build, own and operate a dedicated chemicals port at the Ta'ziz Industrial Chemicals Zone in Al Ruwais, and a 15-year partnership with Borouge to support the expansion of petrochemical exports.

OPERATIONAL AGILITY THROUGH TECHNOLOGY & EFFICIENCY GAINS

Digitalisation and AI-enabled systems played an increasingly central role in enhancing operational performance and responsiveness across ADNOC L&S's activities.

The deployment of the Smart Port solution across petroleum port operations reduced service sourcing time from three hours to 45 seconds, while increasing jetty utilisation by 20 per cent and improving vessel turnaround times.

These efficiencies support faster coordination of marine services and more effective use of port infrastructure.

Further enhancements to the Integrated Logistics Management System introduced predictive cargo routing, AI-driven vessel optimisation, and redesigned container configurations that increased cargo capacity by up to 40 per cent.

Across the year, the company handled more than 2.1 million tonnes of cargo and facilitated nearly 255,000 passenger transfers, reflecting the scale of logistics activity supported by these systems.

The integration of Navig8 has also enabled the deployment of advanced analytics platforms such as ShipWatch, which has been rolled out across more than 20 tankers.

By aggregating and analysing real-time vessel data, the system supports improved voyage execution, fuel efficiency, and emissions tracking, contributing to both operational performance and environmental management.

Decarbonisation progress remained a key component of the company's operational strategy, with a reported 58 per cent reduction in carbon intensity compared to the 2019 baseline.

This was supported by investments in energy-efficient vessels and optimisation technologies across the fleet.

At the same time, safety performance reached industry-leading levels, with a Total Recordable Injury Rate of 0.09 per million manhours, achieved alongside a 19 per cent increase in total exposure hours.

Efficiency initiatives also contributed to overall performance, with the Value Efficiency Initiative delivering $119 million in 2025, exceeding its target and prompting an increase in expected annual contributions to an average of $90 million through 2030.

These gains were driven by cost optimisation, operational integration, and targeted improvements in asset management.

Workforce capacity expanded in line with operational growth, with more than 12,000 employees and contractors supporting global activities.

Investments in training, digital capability development, and organisational integration were aligned with the deployment of AI-enabled systems and the company's broader strategy of building a scalable, integrated logistics platform.

The combination of contracted revenue visibility, diversified global operations, digital optimisation, and financial discipline reinforces ADNOC L&S's capacity to sustain performance and maintain operational continuity across a complex and evolving energy logistics landscape. ■

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ADNOC Drilling fortifies Gulf energy services amid regional uncertainty

The company is leveraging technology, unconventional resources, and long-term contracts to ensure resilience, continuity, and growth amid escalating Gulf geopolitical tensions and market uncertainties

IN a Gulf energy landscape increasingly shaped by geopolitical tensions, ADNOC Drilling has emerged as a model of operational resilience, combining scale, technology integration, and regional expansion to safeguard continuity and growth.

Its 2025 results reflect not only record financial performance but also a strategic approach designed to withstand external pressures while maintaining high operational efficiency and long-term revenue visibility.

According to the ADNOC Drilling 2025 report, the company posted revenue of $4.9 billion, up 22 per cent year-on-year, with net profit rising 11 per cent to $1.45 billion.

EBITDA margins remained robust at approximately 45 per cent, while conventional operations achieved 51 per cent.

Free cash flow reached $1.24 billion, supporting a total dividend of $1.0 billion and reinforcing a progressive dividend policy targeting at least $6.8 billion through 2030.

These figures reflect a financial profile underpinned by long-term ADNOC contracts, providing stability and capital certainty even amid potential regional disruptions.

An ADNOC Drilling hybrid rig ... technology integration is central to operational resilience

OPERATIONAL SCALE & TECHNOLOGY AS RESILIENCE LEVERS

ADNOC Drilling manages a fleet of 169 rigs with 98 per cent availability, including 92 onshore, 36 offshore jack-ups, and 12 island rigs.

In 2025, the company delivered 836 wells, including 666 onshore and 170 offshore, while expanding its integrated drilling services (IDS) footprint to 60 rigs and servicing 58 rigs with discrete operations.

The IDS model allows ADNOC Drilling to oversee the full lifecycle of wells, from drilling through completion, reducing exposure to delays and disruptions while capturing greater value per project.

Technology integration and unconventional resource development have become central to operational resilience.

AI-enabled systems cut non-productive time by up to 20 per cent, shortened well duration by 4.5 days, improved rate of penetration by 20 per cent, and reduced operational risk exposure by 75 per cent.

These efficiencies produced $150 million in savings while lowering emissions by roughly 30 kt-CO_2e, illustrating that technology investments enhance both environmental performance and operational reliability.

Embedding digital monitoring, automation, and AI-driven analytics directly into workflows ensures consistent performance even under external pressures, a critical capability in a conflict-prone region.

Parallel to these advancements, the Turnwell joint venture has accelerated the development of unconventional resources.

Under a Phase 1 contract valued at $1.7 billion, 87 wells have been delivered, achieving drilling times of under 15 days and reducing pad-level cycle times by more than 50 per cent.

With unconventional resources estimated at 220 billion barrels of oil and 460 trillion cu ft of gas, the initiative represented over 40 per cent of wells drilled in 2025, signalling a growing contribution to total output and providing a diversified operational base capable of mitigating regional supply shocks.

Complementing operations and technology is Enersol, a joint investment platform with Alpha Dhabi, mandated to deploy up to $1.5 billion.

To date, $700 million has been invested across four acquisitions, including companies specialising in measurement-while-drilling, high-pressure completion, diagnostics, and advanced manufacturing.

These assets are integrated into ADNOC Drilling's operations to enhance well integrity, efficiency, and real-time decision-making.

Enersol's capabilities also extend into geothermal applications, offering versatility beyond conventional hydrocarbons, a strategic asset in an increasingly uncertain energy environment.

REGIONAL EXPANSION & CONTRACT SECURITY

In 2025, ADNOC Drilling acquired a 70 per cent stake in a joint venture with SLB covering land drilling in Kuwait and Oman, completed in January 2026, and an 80 per cent stake in MB Petroleum Services, which operates across Oman, Kuwait, Saudi Arabia, and Bahrain.

These transactions mark the company's first major move outside the UAE, establishing a geographically diversified platform and reducing reliance on any single market, a key defensive measure in a Gulf energy system exposed to geopolitical tension.

Long-term contracts underpin operational stability. In 2025, ADNOC Drilling secured major awards, including a $1.15 billion, 15-year contract for two jack-up rigs and a $1.63 billion integrated drilling services agreement.

Additional agreements for island rigs and oilfield services extended total contract awards to $3.6 billion, with first-half additions of $4.8 billion.

Coupled with debt refinancing, including a $500 million loan and a $1.5 billion revolving facility, these arrangements provide both liquidity and investment flexibility, enabling ADNOC Drilling to maintain operations and service delivery in a volatile regional environment.

The convergence of these factors positions ADNOC Drilling at the centre of a shifting Gulf energy services landscape.

Its integrated model, long-term contracted revenues, and geographically distributed operations allow the company to operate at industrial scale while preserving high margins, robust cash generation, and continuity of service even under external pressures.

In a region where energy security is increasingly intertwined with geopolitical dynamics, ADNOC Drilling exemplifies the capacity to manage risk while pursuing growth.

As Gulf energy services face an era of heightened uncertainty, ADNOC Drilling's strategy underscores a critical lesson: Resilience is built not solely through financial or operational scale, but through technology adoption, diversification, and long-term contractual discipline.

The company's 2025 performance demonstrates that even amid regional stress, a technology-enabled, integrated service platform can deliver stability, growth, and reliability, ensuring it remains central to ADNOC's upstream ambitions and the broader Gulf energy ecosystem. ■

BASF's DeNOx catalysts achieve over 99 per cent N_2O removal

BASF catalysts drive global CCUS, circular chemical production transformation

New technologies aim to cut costs and deliver measurable emissions reductions across GCC industries, while sustaining chemical production, Christian Peters tells *OGN*

BY ABDULAZIZ KHATTAK

BASF is positioning catalysts and adsorbents at the centre of cost-effective carbon capture, utilisation and storage (CCUS), targeting system-wide efficiency rather than capture alone.

By addressing critical steps such as CO_2 dehydration, the company aims to lower energy demand, simplify operations, and improve reliability for large-scale deployment.

Its Sorbead® adsorbents and catalyst portfolio enable both conditioning and conversion of CO_2 into valuable products, supporting circular feedstocks.

"CCUS is not a substitute for energy efficiency, electrification, or renewables; it is a complementary solution," Christian Peters, Vice-President, BASF Global Chemical Market Catalysts, tells ***OGN*** energy magazine in an exclusive interview.

Across GCC clusters, BASF reports tangible results, including over 99 per cent nitrous oxide abatement and extended process efficiency.

Combined with X3D® catalyst innovation and a diversified supply network, the company is reinforcing resilience while advancing lower-carbon chemical production.

Below are excerpts from the interview:

What role do BASF's catalysts and adsorbents play in CCUS, and how do you respond to criticism that CCUS may slow broader emissions reductions?

BASF's role is to make CCUS economically viable by reducing total system cost, not just optimising the capture step.

A critical but often underestimated element is CO_2 dehydration. For transport, utilisation, or storage, CO_2 must meet strict water specifications to avoid corrosion, hydrates, and reliability issues.

While liquid desiccant systems such as TEG are proven, they are energy intensive and complex, especially for large, dry, high purity CO_2 streams.

This is where BASF's Sorbead® solid adsorbents are highly differentiated. Designed specifically for CO_2 dehydration, Sorbead® offers lower energy demand, simpler operation, and reduced solvent handling compared with conventional TEG systems.

This translates directly into lower operating costs, higher on stream factors, and more predictable long term performance; key levers for scaling CCUS.

Beyond capture and conditioning, catalysts are central to CO_2 utilisation. BASF's catalyst portfolio enables conversion of captured CO_2 into products, such as methanol or other intermediates, turning emissions into feedstock.

This is reflected in BASF's Green Map, which positions catalysts and adsorbents as enablers of circular feedstocks and lower carbon value chains.

Regarding concerns about CCUS, BASF is clear: CCUS is not a substitute for energy efficiency, electrification, or renewables; it is a complementary solution for hard to abate process emissions

»

»
that are intrinsic to chemical reactions.

Can you share concrete examples of measurable emissions reductions or savings delivered in GCC clusters, and the main challenges encountered?

Across GCC industrial clusters, BASF's catalyst and adsorbent technologies have delivered quantifiable sustainability and economic benefits by targeting high impact process steps.

One clear example is nitrous oxide abatement. BASF's DeNOx and DeN$_2$O catalysts routinely achieve over 99 per cent N$_2$O removal.

Given that N$_2$O has a global warming potential nearly 300 times higher than CO$_2$, eliminating just one tonne of N$_2$O is equivalent to avoiding roughly 300 tonnes of CO$_2$.

At large GCC sites, this translates into hundreds of thousands of tonnes of CO$_2$ equivalent reductions over a catalyst lifetime, without compromising production rates.

Another example is feed and intermediate purification using BASF Selexsorb® adsorbents in olefin and polymer complexes.

By deeply removing sulphur, oxygenates, nitrogen compounds, and COS, these adsorbents protect downstream catalysts and stabilise operations.

Customers typically achieve longer cycle lengths, reduced regeneration energy, extended polymer catalyst life, and fewer off spec products.

How is BASF adapting its catalyst supply strategy to enhance resilience amid volatility and rising regional competition?

BASF operates a multi regional manufacturing and supply network across Europe, the Americas, and Asia, supported by global R&D and technical service hubs.

This footprint mitigates geopolitical risk, logistics disruptions, and raw material volatility while ensuring reliable supply to GCC customers.

Rising competition from local GCC players is not a threat, but a catalyst for differentiation.

BASF's response is twofold: Maintain global manufacturing flexibility to stay competitive, while increasingly focusing on value driven catalyst solutions that help GCC producers compete on performance and sustainability, not just price.

Combined with strong local technical engagement, this positions BASF as a long term partner in a more volatile and innovation driven market.

With regard to BASF Winning Ways strategy, what has changed in your daily work, and what does it mean for chemical market catalysts?

Winning Ways reinforces a sharper focus on value creation, agility, and customer impact.

In daily work, this translates into faster decision making, stronger customer centricity, and an even greater emphasis on innovation.

While BASF has built a strong culture over 160 years, Winning Ways raises ambition further, challenging teams to accelerate solutions, help customers succeed more, and continuously improve performance across the chemical market catalyst business globally.

As economic headwinds affect the chemical industry globally, how can BASF chemical market catalysts support producers?

BASF remains committed to supporting customers through efficiency, innovation, and reliability.

Growth regions, such as the Middle East and India, strengthen the industry's outlook, and innovations like BASF's 3D printed X3D® catalysts allow customers to outperform even in difficult markets.

How does chemical catalysts contribute to innovation, and what is the latest breakthrough?

Chemical catalysts contributes by combining deep catalytic know how with advanced manufacturing.

A prime example is BASF's X3D® catalyst shaping technology, which applies additive manufacturing to industrial catalysts.

X3D® was first introduced in sulphuric acid production in 2019. Its open, engineered structure significantly reduces pressure drop while maintaining high activity, delivering lower energy consumption and improved plant economics without changes to process design.

Since then, BASF has validated X3D® across applications, built strong commercial references, and demonstrated repeatable customer value.

This culminates in a major milestone in Q1 2026, when dedicated commercial production capacity for X3D® comes on stream, enabling supply at industrial scale.

In parallel, BASF extended X3D® to N$_2$O abatement. By combining proven DeN$_2$O chemistry with X3D® shaping, BASF achieves very high removal rates with substantially lower pressure drop delivering significant energy savings and CO$_2$ equivalent reductions worth several million euros per year.

Importantly, X3D® is a drop in, low capital solution, allowing customers to realise immediate benefits simply by upgrading catalyst geometry.

How do sustainability and circularity trends shape your business?

Two trends dominate: Circular feedstocks and lifecycle accountability. As the industry shifts toward CO$_2$ derived, bio based, and waste derived feedstocks, catalysts play a critical role in managing new impurities and reaction pathways while maintaining economic viability.

At the same time, customers increasingly assess full lifecycle impacts, including catalyst lifetime, replacement frequency, and end of life handling.

BASF addresses this through longer lasting, more robust, and increasingly recyclable catalysts, reducing waste and embedded carbon per tonne of product.

Together, these trends place catalysts at the centre of the sustainability transformation.

How important are face to face interactions in such a technical industry?

Face to face interaction remains essential. Being present at a plant builds a shared understanding of operating realities and accelerates troubleshooting during start ups or upsets. It is also fundamental to trust building, especially for mission critical assets like catalysts.

Finally, in person collaboration enables better joint decision making and co innovation.

While digital tools enhance analysis, personal engagement drives alignment, confidence, and speed. At BASF, this is a strategic advantage.

GCC feedstocks often have elevated sulphur levels. What challenges and opportunities does this create?

High sulphur content poses operational challenges but also creates downstream value.

BASF addresses removal and protection with solutions, such as Durasorb® RSH for mercaptan removal, high performance SRU catalysts for sulphur recovery, and sulphur resistant E 15x S catalysts for PyGas hydrogenation, enabling greater feedstock flexibility.

Recovered sulphur becomes a strategic raw material, particularly for sulphuric acid production.

BASF's QUATTRO and X3D® sulphuric acid catalysts enable efficient, low emission conversion with long catalyst life.

How do new manufacturing technologies influence performance and sustainability?

Emerging manufacturing technologies are redefining catalyst design.

X3D® removes geometric constraints of traditional shaping, enabling open structures that optimise flow, mass transfer, and heat management.

The result is lower pressure drop, lower energy consumption, and higher throughput.

X3D® has been proven in commercial operation since 2019 and with the commercial production capacity coming on stream in Q1 2026, it is now scaling across applications.

Its sustainability impact is immediate: less energy per tonne, lower CO$_2$ emissions, and longer catalyst life with less material use.

More broadly, X3D® exemplifies how design driven innovation unlocks efficiency gains previously inaccessible, making chemical processes structurally more sustainable. ■

BASF's X3D catalysts ... 3D printed

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The newly-expanded Abu Dhabi facility being inaugurated

Expanded facility, enhanced capability & proven delivery boost Nabors' operations

The milestone reinforces Nabors' commitment to delivering integrated solutions that enhance operational performance and create measurable value for customers, Kevin Almeida tells *OGN*

NABORS UAE's newly-expanded Abu Dhabi facility marks a significant milestone in strengthening its operational capabilities across the Middle East.

More than physical expansion, the facility represents a strategic advancement toward integrated service delivery, operational efficiency, and long-term customer partnerships.

The transition to the new 42,800-sq-m facility was completed safely and efficiently, with zero lost-time incidents, an achievement that reflects Nabors' disciplined execution and strong safety culture.

Mohamad Arafa, General Manager, Nabors Abu Dhabi, emphasises that safety remains the top priority throughout the relocation and commissioning process.

The opening ceremony was attended by the local management team, along with Kevin Almeida, Managing Director – MENA, Nabors Drilling Solutions & Canrig, and Subodh Saxena, Senior Vice-President of Nabors Drilling Solutions and Canrig, underscoring the strategic importance of the expansion within Nabors' broader regional growth strategy.

FACILITY DESIGNED FOR CAPABILITY & SCALE

The Abu Dhabi facility brings together a broad portfolio of services within a single, integrated operational hub.

These include advanced machine shops, fishing services and tools, tubular running services (CDS and conventional), pressure control equipment, and comprehensive equipment rentals.

The site also supports specialised services, such as drill pipe rental, automated catwalk and offline bucking units, drilling tool rentals (including stabilisers and jars), high-torque wrenching, subassembly, cold cutting, and nitrogen testing services.

By consolidating these capabilities in one location, Nabors enables streamlined coordination, improved responsiveness, and reduced operational complexity for customers.

MACHINE SHOPS: PRECISION & PROVEN PERFORMANCE

At the heart of the facility are Nabors' machine shop and inspection operations, which play a critical role in ensuring oilfield equipment performs reliably in demanding environments.

Across the region and beyond, Nabors operates five state-of-the-art machine shops located in the UAE, Saudi Arabia, India, and two facilities in Norway, delivering manufacturing, repair, inspection, and recertification services under industry-leading licenses and certifications.

Supported by highly qualified en-

> *The Abu Dhabi expansion positions the facility as a key operational hub supporting both current demand and future growth across the Middle East*

achievements across the region.

In a recent milestone with a leading UAE operator, Nabors' fishing team successfully completed a 150-ft section milling operation using a 7 x 9 5/8-inch dual casing section mill in a single trip, completing the operation in just 3.9 days.

This achievement sets a new benchmark in operational efficiency and execution.

In another complex offshore intervention, the team executed a challenging slot recovery operation involving dual 9-5/8-inch and 13-3/8-inch casing recovery inside a 30-inch conductor.

The operation was completed in eight days, saving 13 days from the planned timeline while maintaining zero incidents and no fishing-related non-productive time (NPT).

INTEGRATED DELIVERY, TANGIBLE VALUE

International Tubular Services (ITS), now operating under the Nabors umbrella, is already serving customers across the Middle East from this expanded base.

By consolidating multiple services through a single provider, Nabors enables one provider, multiple services, fewer interfaces, lower costs, and greater operational certainty.

For customers, this integrated model simplifies execution, improves coordination, reduces downtime, and enhances overall operational efficiency.

For Nabors, it strengthens service delivery, improves resource utilisation, and fosters long-term strategic partnerships rather than transactional sourcing.

REGIONAL PLATFORM FOR GROWTH

The Abu Dhabi expansion positions the facility as a key operational hub supporting both current demand and future growth across the Middle East.

As drilling programmes increase in complexity and performance expectations rise, proximity to integrated, high-quality services become increasingly valuable.

STRENGTHENING REGIONAL MANUFACTURING

The expansion aligns with broader capability growth across the UAE. The Canrig UAE team recently secured an API 8C Certification from the American Petroleum Institute for Top Drives, enabling full local manufacturing in Dubai in compliance with API requirements.

This milestone allows Nabors to move beyond partial assembly to complete manufacturing, delivering shorter lead times, smarter cost structures, and greater flexibility, all backed by stronger localisation and deeper customer trust.

Almeida emphasises that the expansion of the Abu Dhabi facility reflects Nabors' long-term commitment to supporting customers across the Middle East through locally available expertise, advanced manufacturing capabilities, and integrated service solutions.

"By strengthening our regional capabilities and achieving key certifications, such as API 8C for Top Drive manufacturing in the UAE, we are enabling faster delivery, greater operational flexibility, and closer collaboration with our customers," he notes.

This milestone reinforces Nabors' commitment to delivering reliable, integrated solutions that enhance operational performance and create measurable value for customers across the region. ■

gineers, machinists, QA/QC specialists, and NDT professionals, these facilities maintain rigorous quality standards that ensure compliance and performance integrity.

FISHING OPERATIONS: SETTING NEW BENCHMARKS

Nabors provides advanced fishing and remedial tools engineered to efficiently recover lost, stuck, or damaged equipment, ensuring safe, cost-effective, and reliable wellbore restoration.

Through its integrated well intervention solutions and specialised downhole tools, Nabors helps operators quickly clear wellbore obstructions, minimise downtime, and restore operational performance while maintaining the highest safety standards.

This integrated approach combines technical expertise, specialised equipment, and operational discipline to deliver safer, more efficient, and cost-optimised interventions that maximise well productivity.

The Abu Dhabi facility is already supporting high-impact operational

The machine shop ... facilitating growth in the UAE

Digital tokenisation: Re-architecting energy capital markets for a digital-first era

Digital tokenisation is emerging as a pivotal tool, enabling energy assets to be represented on-chain and integrated directly with investor and regulatory ecosystems, Faisal Monai tells *OGN*

BY ABDULAZIZ KHATTAK

THE energy sector is entering a period of profound transformation, driven by the convergence of digital finance and infrastructure investment.

As demand for cleaner, more efficient energy sources grows, stakeholders are increasingly exploring innovative ways to mobilise capital, enhance transparency, and streamline operations across complex projects.

"Digital tokenisation is emerging as a pivotal tool, enabling energy assets to be represented on-chain and integrated directly with investor and regulatory ecosystems," Faisal Monai, Co-Founder & CEO, droppR-WA, tells ***OGN*** energy magazine.

In the Middle East, this evolution is already underway. ADNOC and IBM have been testing blockchain applications across oil and gas supply chains, supporting initiatives to digitise and streamline energy project management.

These early deployments demonstrate how energy companies are embracing technology not only to improve operational efficiency but also to prepare the sector for broader institutional investment and global market integration.

Faisal Monai

> ***The immediate benefit of tokenisation is the ability to break down massive, multi-billion-dollar energy projects into smaller, manageable digital units. This process, known as fractionalisation, fundamentally changes access to these assets***

INCREASING ADOPTION

Growing institutional adoption of the Real-World Asset (RWA) sector is accelerating, with projections suggesting a total market of $2 trillion by 2030.

Sovereigns and financial institutions are increasingly recognising that this new capital markets infrastructure offers more than mere incremental improvement: It provides a complete overhaul for operational efficiency, instant, legal ownership, and asset investability.

At its core, tokenisation is the moving of physical assets on-chain, where the legal and economic rights of an underlying physical asset are embedded into a digital-native token on a blockchain.

Previously categorised as an experimental framework for consumer-scale assets, this technology is now being applied to critical infrastructure and high-value sovereign assets, including commercial real estate, global commodities, and large-scale energy projects.

Historically, nations have been cautious regarding the digitisation of critical infrastructure. However, the emergence of sovereign-grade infrastructure, where law is built directly into the code, has shifted this paradigm.

By integrating digital issuance directly with national registries, governments are now enabling the creation of regulator-native digital entities that carry full legal weight.

There is one sector which could benefit enormously from this: the energy industry.

EXPANDING ACCESS THROUGH FRACTIONALISATION

The immediate benefit of tokenisation is the ability to break down massive, multi-billion-dollar energy projects into smaller, manageable digital units.

This process, known as fractionalisation, fundamentally changes access to these assets.

In the traditional model, a utility-scale solar or wind farm is an indivisible block of capital, accessible only to a few major institutional players.

By fractionalising these assets, the minimum ticket size is significantly reduced, allowing a much broader base of investors to participate.

This doesn't just open the door for more players; it allows developers to source capital from a more diverse, global pool, bypassing the traditional funding bottlenecks that often stall large-scale projects.

CREATING LIQUIDITY THROUGH SECONDARY MARKETS

While fractionalisation provides the entry point, the digital nature of these units is what creates actual liquidity.

Historically, if an investor put capital into a private energy project, that money was "locked" for years; and there was no simple way to exit a position or rebalance a portfolio.

By placing these fractional shares on a digital rail, the development of active secondary markets is enabled.

Investors can now buy or sell their holdings with far greater ease, moving capital in and out of projects as needed.

This shift makes energy infrastructure a much more attractive destination for discretionary capital, as investors no longer have to fear their funds being trapped in an illiquid asset for a decade.

PROGRAMMABLE REVENUE & AUTONOMOUS SETTLEMENT

A critical technical advantage of tokenisation is the transition from slow, manual record-matching to programmable revenue distribution.

Through the utilisation of smart contracts, self-executing, programmable protocols, originally slow-moving assets can be transformed into intelligent, high-velocity financial instruments.

In legacy systems, a solar installation selling electricity to a national grid requires intensive manual auditing and prolonged quarterly settlement periods.

»




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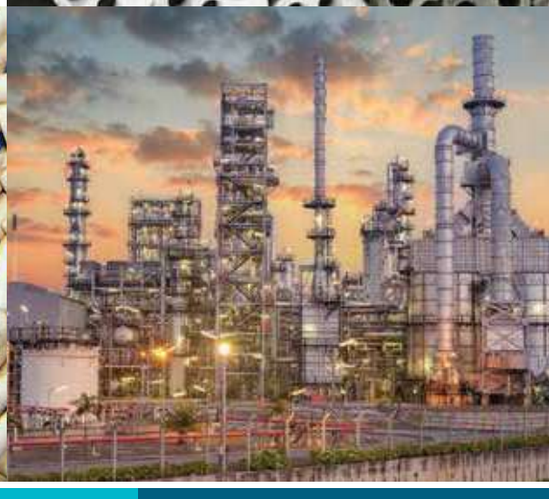

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Despite in the primary issuance phase, the industry's largest players are already using energy tokenisation

Digital tokenisation: re-architecting energy capital markets

In a tokenised environment, revenue will be able to be distributed autonomously and instantaneously to token holders, triggered by real-time production data from the source.

This level of automation facilitates accelerated access to working capital, reduces operating costs, and establishes a new benchmark for stakeholder transparency.

By utilising an immutable ledger, the potential for disputes is mitigated, creating a verifiable and accountable value chain from generation to distribution.

This is the design target that sovereign-grade tokenisation infrastructure is being built toward; the technical foundation is being laid now in primary issuance deployments.

IMMUTABLE ESG PROVENANCE

Tokenisation provides the necessary infrastructure to prove a project's green credentials, rendering the green attributes of a project verifiable and immutable.

By tokenising carbon credits or renewable energy certificates at the point of origin, each token represents substantiated, digital evidence of environmental practice.

For full disclosure, while tokenisation improves chain-of-custody and audit trail integrity at the point of issuance and transfer, it doesn't independently verify the underlying environmental claim.

> ***Tokenisation provides the necessary infrastructure to prove a project's green credentials, rendering the green attributes of a project verifiable and immutable***

That process is still undertaken using normal practices, with the verified data being shared on-chain.

However, it still creates a high-integrity mechanism for corporations to offset their environmental footprint with total transparency.

In an era of heightened regulatory and consumer scrutiny, these programmable ESG profiles mitigate "greenwashing" risks and provide a clearly identifiable audit trail for compliance.

THE INSTITUTIONAL ROADMAP

We are currently in the primary issuance phase of energy tokenisation, yet the industry's largest players are already starting to use this technology.

EDF Group's Saudi RHQ, in collaboration with droppRWA, are integrating blockchain protocols within the Saudi energy landscape.

This strategic collaboration focuses on enhancing project liquidity, and developing standardised frameworks for the regional carbon credit market.

This momentum is reflected across the wider GCC.

From ADNOC's and IBM's oil and gas supply-chain blockchain pilot, Abu Dhabi's potential exploration of blockchain-based clean energy certificates, and NEOM's vision for a digitally tracked energy grid, the Gulf is establishing the sovereign-grade rails required for a global energy transition.

The shift towards sovereign-approved tokenisation represents a structural re-architecting of the energy sector.

By enhancing investability, automating cash flows, and providing immutable sustainability data, this infrastructure is no longer a matter of theoretical exploration, but a prerequisite for the next generation of global capital markets. ■

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Has energy transition in Mena region entered its most complex phase yet?

The challenge with Mena's energy transition is no longer building renewable capacity but coordinating increasingly digital, interconnected power systems securely and efficiently, Remi Ramcharan tells *OGN*

BY ABDULAZIZ KHATTAK

LOOKING at the Middle East and North Africa's (Mena) energy transition today, there are often comments around vast ambition and inspiring vision.

"And while I wholeheartedly agree with this sentiment, what stands out more to me is what has already been translated into action," Remi Ramcharan, Vice-President at Senkron Digital, tells ***OGN*** energy magazine.

Solar parks now stretch across desert landscapes, major green hydrogen facilities are nearing completion, wind projects are steadily multiplying, and battery storage facilities are moving at scale and pace that would have seemed improbable only a few years ago.

Yet as ambition turns into delivery, a new tension emerges in how effectively these new assets can be managed and coordinated.

For operators, who must balance these systems in real time, whether that's the engineers managing load curves as temperatures spike, or the grid controllers monitoring fluctuating frequency stability, the ability to handle the growing complexity of managing asset interaction as generation accelerates will be the next defining phase in the region's energy transition.

FROM EXPANSION TO ORCHESTRATION

For much of the past decade, the region has been understandably focused on both oil and gas and renewable expansion as countries diversify energy mixes, reducing total reliance on hydrocarbons while protecting energy security, and rapidly accelerating renewable deployment.

This is driven by the projected 50 per cent rise in electricity demand in Mena by 2035, and is in line with ambitious national transformation agendas that have embedded long-term diversification strategies, such as Saudi Arabia's Vision 2030, the UAE Energy Strategy 2050, and Qatar National Vision 2030.

So in that context, scale was (and indeed still is) the priority, and that's precisely what the region delivered.

Solar in parts of Mena is now among the cheapest sources of electricity globally, large-scale projects have been swiftly executed, and storage is beginning to scale alongside generation.

Now though, operators are moving beyond the installed capacity figures and are faced with the complex task of effective coordination to ensure generation, demand, storage and grid infrastructure are aligned in the right place at the right time.

Instead of scarcity, they are managing moments where supply could exceed what local networks can transport, where renewable output must be reduced because transmission corridors are constrained, and where storage assets are technically available but not optimally dispatched to relieve pressure or capture value.

CASE STUDY: SAUDI ARABIA'S SOLAR SURGE & COORDINATION CHALLENGE

Saudi Arabia's renewable expansion under Vision 2030, which aims to generate 50 per cent of electricity from renewables by the end of the decade, is a great example of this inflection point.

In just five years, the Kingdom has become a global solar powerhouse, with 12 GW of solar capacity already installed (correct as of the end of 2025), and flagship projects, such as the 300-MW Sakaka plant and the 1.5-GW Sudair solar project soon to be accompanied by new capacity under the National Renewable Energy Programme.

What changes as solar capacity rises, however, is less about the ability to actually generate power and more about the complexity of managing it.

When large volumes of solar are concentrated in particular regions, peak production periods can

strain local transmission corridors or outpace demand patterns, requiring more active balancing and dispatch decisions.

As evening demand rises and solar output falls away, system operators must coordinate conventional generation, interconnections and emerging storage resources with far greater precision than in historically predictable systems.

In this sense, the operational focus shifts from adding megawatts to managing variability, congestion and timing across a far more complex network.

Saudi Arabia continues to invest in grid reinforcement and flexibility solutions, and storage deployment is increasing, but the broader lesson is that scaling infrastructure does not automatically resolve coordination challenges.

As renewable penetration deepens, the grid must function less as a one-directional transport mechanism and more as a responsive, digitally enabled platform capable of orchestrating diverse and variable assets in real time.

STORAGE IS SCALING BUT IS IT STRATEGICALLY INTEGRATED?

As countries across Mena, such as Saudi Arabia, continue to push towards higher renewable penetration and greater flexibility, battery energy storage systems (BESS) are increasingly talked about as the answer to grid constraints.

But simply building batteries does not automatically mean the system is better coordinated.

In practice, storage projects are often planned around project-level economics, meaning batteries are located where land is available, where solar is already being developed, or where financial modelling looks most straightforward, rather than around where the grid is actually constrained or where flexibility would create the greatest system-wide value.

The result? Batteries are not always positioned to relieve congestion, manage volatility or participate fully in evolving market structures.

Once you factor in the region's extreme climate, the additional realities of heat, thermal management and accelerated degradation further complicate both performance expectations and long-term economics.

What this creates is not a failure of storage; rather it is that storage assets have not been embedded deeply enough into operational strategy to deliver their full potential in terms of congestion relief, flexibility or revenue optimisation.

There is a significant optimisation opportunity here to integrate it deliberately into planning, forecasting and dispatch decisions so that it strengthens the system in practice, not just on paper.

BRIDGING GAP BETWEEN PLANNING & GRID REALITY

Now the question becomes how to properly integrate storage into operational strategy, and the answer lies in system modelling during the planning phase, because this is where decisions are made about how the asset is expected to behave once it is live on the grid.

Storage projects may be sized for nominal use cases, based on average irradiance or assumed cycling patterns that look reasonable in theory, but real operating environments are far more dynamic.

In reality, weather changes, prices move, grid constraints shift, and batteries degrade over time, and all of those factors interact in ways that basic assumptions simply cannot capture.

Without scenario analysis and predictive modelling, operators risk developing assets that technically function but strategically underperform, with cycling strategies that erode battery life faster than anticipated, revenue projections that fail to reflect actual dispatch conditions, and congestion that persists because storage is not coordinated at a portfolio level.

So in practice, the battery works, but it does not work optimally for the system it was intended to support.

OPTIMISATION IN ERA OF HEIGHTENED SECURITY RISK

The Middle East is currently navigating today's heightened geopolitical tension and active conflict, which is having a direct impact on the energy industry.

In this environment, the resilience of critical infrastructure becomes an immediate priority.

Not only in terms of physical security and continuation; but digitally too, as threats extend into sophisticated cybersecurity challenges, which are only heightened as grids become more digital and interconnected, multiplying vulnerability pathways.

In this sense, optimisation without robust OT cybersecurity foundations becomes a risk multiplier, because interconnected digital platforms and remote dispatch capabilities can enhance performance but also introduce operational fragility if not secured appropriately.

In this context, availability, reliability and safety are inseparable from cybersecurity, and this next phase of the energy transition must embed resilience into every layer of grid modernisation.

NEXT PHASE OF TRANSITION

Mena has already demonstrated its ability to build renewable capacity at scale, combining ambition, investment discipline and engineering expertise in a way that has reshaped the region's energy landscape.

The challenge in this transition has now evolved beyond generation to grids, flexibility, coordination and resilience advancing together.

Taking this all into account, the next phase of infrastructure development in my view, will hinge on how successfully assets can be integrated into connected, digitally enabled systems that demand precision, coordination and strong security.

"I predict that the leaders will take an outside-in approach, looking to the wider operational ecosystem and investing in operational management and cybersecurity alongside expansion. Whereas those focused only on capacity will find that building the assets was the straightforward part and making them work together is actually the real test," says Ramcharan. ■

OnePact ... Senkron's renewable energy management