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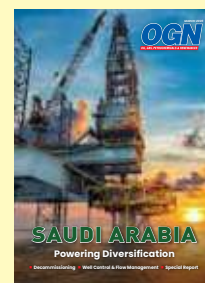
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Unique Group: Top
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14



GARMCO aims to be
low-carbon leader

34



Ecoflox champions
wildlife storytelling

38

BAHRAIN PLANS MIDDLE EAST'S FIRST 'GREEN UNIVERSITY'

BY ABDULAZIZ KHATTAK

**The initiative integrates finance
industry education with
advance regional ecological
transformation**

BAHRAIN has launched a higher-education platform integrating sustainability, industrial innovation and finance.

The initiative, created by Veolia, Terra Academia International and Bahrain Institute of Banking and Finance, seeks to establish the Middle East's first 'green university' dedicated to ecological transformation.

It aims to train 5,000 students and professionals by 2030.

Launch attendees included Dr Mohammed bin Mubarak Juma, Khalid Ebrahim Humaidan, Eric Giraud-Telme and Khalid Al Rumaihi, underscoring institutional alignment.

Speaking to **OGN** energy magazine,



Bahraini and French officials at the Terra Academia launch

Jean-Michel Blanquer, Chairman, Terra Academia, says the programmes will initially operate within BIBF, start-

ing with an executive seminar in April 2026 and a Master's in Waste Management in 2027. A dedicated cam-

pus is under consideration.

He defines the model as an architect of transformation programmes uniting academic and economic institutions to deliver scientific, financial and operational competencies directly applicable to corporate strategy.

The faculty will come from across the world, including Bahrain, reflecting what Blanquer calls a worldwide approach.

French academic traditions, including perspectives linked to Philippe Aguilon and research excellence exemplified by University of Strasbourg, are expected to influence curricula alongside shared expertise in decarbonation, electrification and energy transition technologies.

As the first cohort approaches, the platform is positioned at the intersection of policy, finance and industry, designed to align scientific rigour with capital deployment and corporate execution globally from 2026 onward. ■

Full report on Page 32

Emerging economies drive global energy transition momentum

THE decisive trajectory of the global energy transition will be determined by emerging economies whose scale, demand growth, and infrastructure gaps are reshaping investment realities, Sony Kapoor, Macroeconomist and Policy Adviser, tells **OGN**.

Kapoor identifies China as on course to becoming the first major 'electro state', with India following, arguing that outcomes in such populous markets will outweigh action in Europe in shaping climate results.

Rapidly rising global energy demand means most additional supply now comes from renewables, while total oil and gas use has not yet recorded serious declines apart from coal, indicating a parallel expansion rather than outright replacement.

Over the next 5 to 10 years, Kapoor expects only marginal reductions in oil and gas consumption, with renewables supplying the lion's share of in-

cremental generation before economies of scale eventually erode fossil fuels' still-large share, a shift already visible in electric vehicles.

Energy justice remains central to policy design, Kapoor stresses, citing Nigeria, where more than 200 million people rely on a national grid with less capacity than the city of Austin, whose population is about one to two million, and which experienced a nationwide grid failure for one or two days in September 2024.

Such disparities underline a world he characterises as structurally unequal, particularly as tropical and subtropical developing states face frontline climate risks including heat stress and flooding, even as they pursue higher-value uses of hydrocarbons to avoid stranded investment.

This shift will redefine capital allocation, competitiveness, trade flows, and technology leadership across energy systems worldwide over coming de-



Sony Kapoor, right, speaking to OGN

cades significantly.

He emphasises the transition's direction is therefore set by emerging markets' choices, capital flows, and technology adoption rates. ■

For full interview, visit: <https://www.youtube.com/@OGN-media>

SAUDI ARABIA 02

- Saudi Arabia accelerates strategic shift toward national quantum economy
- JOSLOC to supply NANO fleet with lubricants solutions
- Gulf doubles down as global sustainable debt markets retreat in 2026
- Kanoo Energy strengthening Kingdom's energy and industrial landscape
- Kingdom's Fourth Industrial Revolution engine to reshape economic strategy
- LOBO brings modular work-at-height systems to Saudi Arabia's industrial sector
- AMPO delivers engineered valve solutions to energy sector globally

Decommissioning 14

- Unique Group: One-stop subsea partner in installation & decommissioning
- Ageing offshore infrastructure fuels global decommissioning market
- Global offshore decommissioning regimes tighten as liabilities escalate
- The Middle East 'prepares' for massive decommissioning of ageing oil assets
- Hoover-Diana decommissioning sets new benchmark for deepwater efficiency

Well Control & Flow Management 24

- Integrated subsea well access advances UK gas production performance
- Well control strengthens safety, efficiency across global energy operations

Views & Analysis 28

- 2026: The year of flex deals and the rise of green energy ecosystem

Special Report 32

- Bahrain launches Terra Academia to anchor regional ecological transition

Industry Leader Interview 34

- GARMCO positions itself as low-carbon leader in aluminium transition

Sustainability & Society 38

- Helping save environment through inspiring storytelling platform

Products & Services 40

Regional News 42

World News 44

Africa Focus 46

Industry Events 48

Business 50

Saudi Arabia has positioned itself for a decarbonising industrial world



SAUDI ARABIA'S ENERGY EVOLUTION CHAMPIONS DIVERSIFICATION

Maintaining its unrivalled position as the world's lowest-cost hydrocarbon producer, the Kingdom is simultaneously deploying renewables, green hydrogen and carbon capture to power energy its diversification strategy

BY ABDULAZIZ KHATTAK

In the early months of 2026, two milestones taking shape simultaneously in the Kingdom of Saudi Arabia encapsulate with unusual clarity the strategic logic that has come to define the country's energy posture.

At Jafurah in the Eastern Province, the world's largest shale gas project outside the US has begun delivering its first condensate cargoes to Asian buyers, with Phase 1 of the gas plant now producing 450 million cu ft per day (mmscf) and on a trajectory to reach two billion cu ft per day (bcfd) of sales gas by 2030.

The programme represents a

total lifecycle investment exceeding \$100 billion.

Hundreds of kilometres to the north-west, at Oxagon in the NEOM development zone, the \$8.4-billion NEOM Green Hydrogen Company (NGHC) complex has crossed 90 per cent construction completion across all project sites, with its 4 GW of combined solar and wind generation infrastructure scheduled for completion by mid-2026 and first green ammonia exports targeted for 2027.

Together, these two projects do not represent a contradiction. They represent a thesis that Saudi Arabia is not abandoning its energy strengths, but deliberately expanding them.

The conventional framing of an en-

ergy transition: Renewables displacing hydrocarbons, has never accurately described the Saudi strategy, and the Kingdom's senior energy officials have been at pains to say so.

At the 46th Energy Intelligence Forum in London in October 2025, Amin Nasser, President and CEO, Saudi Aramco, articulated the position with characteristic directness: "In reality, this is not a true energy transition; it's an energy addition which requires all hands on deck."

The statement is not a retrenchment; it is the operating framework for a Kingdom that intends to remain the world's most reliable supplier of affordable hydrocarbons while simultaneously constructing a diversified, export-competitive econom-



ic base that can sustain prosperity well into the post-oil era.

TRADITIONAL ENERGY REMAINS THE BEDROCK OF SAUDI STRATEGY

Saudi Aramco's role as the world's pre-eminent low-cost crude producer is not under revision.

Across official reporting, the company has confirmed that work is ongoing to maintain its maximum sustainable crude oil capacity at 12 million bpd (bpd), supported by increment projects at Marjan, Berri, Zuluf and Dammam, all on track for completion between 2025 and 2027.

The Zuluf offshore increment alone, one of Aramco's largest offshore undertakings in recent years, is designed to process up to 600,000 bpd of Arabian Heavy crude through a new central processing facility, with associated gas routed to the Tanajib Gas Plant as part of the integrated Marjan development programme.

Total hydrocarbon production reached 13.3 million barrels of oil equivalent per day (boepd) in the Q3 2025, underscoring the depth of the company's upstream position.

Downstream, Aramco's integration into chemicals and petrochemicals continues to advance, with the world-scale Amiral petrochemical complex at Jubail incorporating a mixed-feed steam cracker with ethylene production capacity of 1.65 million tonnes per year (mtpa) alongside two polyethylene lines each producing 500,000 tonnes annually.

This downstream expansion represents precisely the value-capture logic at the core of Saudi energy strategy, and gas is increasingly central to that logic.

The Jafurah unconventional field, which is estimated to contain 229 trillion standard cu ft (tcf) of raw gas and 75 billion stock tank barrels of condensate, is the centrepiece of Aramco's ambition to grow overall gas production capacity by more than 60 per cent by 2030 relative to 2021 levels.

Phase 1 of the Jafurah Gas Plant, which commenced construction in November 2021, reached initial start-up in 2025, as confirmed in the Saudi Ministry of Finance's 2026 budget statement.

Phase 2, valued at approximately \$12.4 billion, covers gas compression facilities, additional processing trains and the new Riyas NGL fractionation plant in Jubail; Phase 3, worth approximately \$8.8 billion, focuses on expanding the Master Gas System pipeline network by an additional 3.15 billion cubic feet per day of capacity.

Aramco calculating that its unconventional gas programme at peak production will generate electricity equivalent to displacing 500,000 bpd of oil, which can then be redirected to export markets.

Nasser has described Jafurah as "a crown jewel" in the company's portfolio, and the contracted \$11 billion lease-and-leaseback arrangement with a consortium led by BlackRock's Global Infrastructure Partners attests to international capital's confidence in the project's long-term economics.

DIVERSIFICATION INSIDE ENERGY SECTOR GATHERS MOMENTUM

The Kingdom's National Renewable Energy Programme (NREP), a strategic initiative under Vision 2030, targets 50 per cent of electricity from renewables by 2030, requiring a total installed capacity of approximately 130 GW.

As of July 2025, Saudi Arabia had developed a project pipeline totalling 58.7 GW, with 10.2 GW already installed and grid-connected across 14 utility-scale plants, a further 28.5 GW under active development, and 13.5 GW under tender.

In October 2025, the Saudi Power Procurement Company (SPPC) awarded five new wind and solar projects totalling 4,500 MW, with the Dawadmi Wind IPP in Riyadh Province setting a new world record for the lowest cost of electricity generation from wind at 1.338 US cents per kilowatt-hour (kWh).

Solar tariffs have similarly broken global benchmarks in recent REPDO rounds, with bids reaching as low as 1.67 cents per kWh, prices that the Saudi Ministry of Energy describes as among the most competitive in the world.

By 2026, renewable capacity is forecast to reach over 13 GW, rising toward 20 GW by end of the year as new project awards from 2024 and 2025 come online.

Green hydrogen represents the most ambitious element of the renewables push, with the NGHC complex at Otagon designed to produce up to 600 tonnes of carbon-free hydrogen per day, converted into approximately 1.2 million tonnes of green ammonia annually for export via a purpose-built jetty.

Complementary technologies complete the picture. Aramco and its partners Linde and SLB signed a shareholders' agreement in December 2024 to develop the Jubail Carbon Capture and Storage hub, with Phase 1 targeting the capture of nine million metric tonnes of CO₂ per year by 2028.

This includes approximately 6 million tonnes from Aramco gas plants and 3 million tonnes from neighbouring industrial emitters, before scaling to 11 million tonnes per year by 2035.

In energy storage, the 2.6-GWh Bisha battery energy storage system was completed in early 2025, marking what industry observers described as

the world's largest single-phase battery storage deployment at the time, as part of Saudi Arabia's national pipeline of 48 GWh of storage capacity targeted by 2030.

By 2030, the Ministry of Energy's Optimum Energy Mix Programme targets renewables and high-efficiency gas each supplying approximately 50 per cent of electricity generation, effectively eliminating the liquid fuel burning that today consumes oil better deployed in export markets.

ENERGY DIVERSIFICATION DRIVES NON-OIL SECTOR GROWTH

The connection between energy diversification and non-oil economic growth is not incidental; it is structural.

Cheaper, cleaner and more stable electricity, derived from the gas-plus-renewables mix being assembled under NREP and Jafurah, lowers the operating costs of energy-intensive industries including petrochemical derivatives, pharmaceuticals, advanced manufacturing and mining.

The mining sector, led by national mining company Ma'aden, now designated the third pillar of the Saudi economy alongside oil and tourism, has benefited from hundreds of exploration licences issued since 2020, with the government targeting \$64 billion in additional GDP contribution and 200,000 jobs by 2030.

Tourism and entertainment present an equally direct linkage, having generated \$75.7 billion in revenue and contributing 4.7 per cent of GDP in 2024 from 116 million visitors, including 30 million international tourists.

For the data centre and logistics sectors, the convergence of abundant and affordable gas and renewable power with Saudi Arabia's geographic position at the intersection of Asia, Africa and Europe creates competitive advantages that are attracting the regional headquarters of over 700 global companies, surpassing the Vision 2030 target of 500 well ahead of schedule, according to Khalid Al-Falih, Saudi Arabia's Minister of Investment.

The macroeconomic indicators are beginning to reflect these structural shifts. Non-oil GDP growth reached 4.3 per cent in 2024, with non-oil activities accounting for approximately 51 per cent of nominal GDP.

The private sector's contribution to GDP has reached 47 per cent, advancing toward the Vision 2030 target of 65 per cent, while active investment licences have grown tenfold from 6,000 in 2019 to 62,000 by the end of 2025.

Foreign direct investments (FDI) reached SR1.05 trillion (\$280 billion) by the end of Q3 2025, a 10 per cent annual increase.

Aramco's In-Kingdom Total Value Add (iktva) localisation programme, which reached 63 per cent procurement from local suppliers in 2023 with a target of 70 per cent by 2025, has become a template for the broader economy.

Oil still accounts for approximately 43 per cent of Saudi GDP and the dominant share of government revenues, meaning fiscal planning remains sensitive to price movements in a market the Kingdom continues to influence through its OPEC+ membership.

FDI inflows, while rising, remain below the target of 5.7 per cent of GDP. Non-oil exports at 25.2 per cent of non-oil GDP trail the 35 per cent interim target set for 2024.

In a global energy system, Saudi Arabia has positioned itself to supply every layer of the stack, from low-cost crude and gas through record-cheap solar and wind to green ammonia for a decarbonising industrial world. ■

Saudi Arabia accelerates strategic shift toward national quantum economy

The Kingdom is aligning policy, research, energy systems and industrial partnerships to operationalise quantum technologies, positioning Saudi Aramco and national institutions at the centre of an emerging global paradigm

BY ABDULAZIZ KHATTAK

SAUDI Arabia is systematically advancing a national quantum economy strategy aligned with Vision 2030 economic diversification and technology leadership goals, seeking to harness quantum technologies across research, industry and government infrastructure.

A quantum economy refers to an ecosystem in which quantum computing, sensing and communications form a foundational technological layer that generates measurable economic value, supported by workforce development, hardware innovation and commercialisation pathways.

A global framework outlined in the World Economic Forum's (WEF) Quantum Economy Blueprint defines a quantum economy as an ecosystem in which quantum hardware, software, infrastructure and applications generate measurable economic value across multiple sectors.

These technologies exploit quantum mechanical phenomena, such as superposition and entanglement to perform tasks that either exceed the practical limits of classical computing or offer qualitatively new capabilities in secure communications and ultra-precise sensing.

Saudi Arabia's initiative positions national institutions, universities and industry players to accelerate capability development and deploy quantum applications that can transform core sectors including energy, materials science, logistics and infrastructure.

Linked to the Kingdom's broader technology and industrial policy objectives, the effort reflects an attempt to shape future high-impact economic clusters through coordinated investment, research infrastructure and international collaboration.

STRATEGIC FRAMEWORK FOR NATIONAL QUANTUM CAPABILITY

The Saudi quantum strategy emphasises five key pillars: Talent development, research capacity expansion, hardware innovation, commercialisation infrastructure and public engagement.

Universities such as the King Fahd University of Petroleum and Minerals (KFUPM) are expanding specialised curricula in quantum computing and related disciplines, and nation-

Quantum technology can be embedded within core economic sectors to contribute meaningfully to national competitiveness



al training programmes including hackathons and workshops with technical institutes are designed to expand the domestic talent pool.

The overarching policy documents highlight workforce capacity as a foundational constraint in quantum technology uptake and thus frame education and certification as strategic infrastructure rather than peripheral initiatives.

To centralise and accelerate development, proposals include a dedicated quantum foundry capable of enabling fabrication, testing and prototyping of quantum processors and subsystems.

Such infrastructure is intended to reduce entry barriers for domestic researchers and small enterprises, consolidating highly specialised equipment and expertise in a shared facility.

The national coordination body for Fourth Industrial Revolution (4IR) technologies has been tasked with stakeholder mapping and governance frameworks that aim to align government, academic and private sector actors toward common performance metrics and commercial targets.

The Centre for the Fourth Industrial Revolution Saudi Arabia (C4IR Saudi Arabia) has led the national Quantum Economy project, coordinating stakeholders and mapping capabilities to establish baseline readiness metrics.

Public engagement forms a parallel track of strategy. Large-scale national events such as World Quantum Day, co-ordinated with educational campaigns and industry roundtables, are intended to build societal awareness and

stimulate early adoption within the research and entrepreneurial communities.

Policymakers emphasise that a 'quantum-literate' workforce and society will be critical to sustaining long-term innovation output and integrating emerging technologies into everyday economic activity.

INDUSTRIAL DEPLOYMENT & ARAMCO'S INITIATIVES

Industrial partnerships are central to converting quantum research into operational capacity, particularly within energy and manufacturing domains.

Saudi Aramco is a key actor in this transition, signalling a strategic shift toward embedding quantum computing capabilities into its digital infrastructure.

In November 2025, Aramco and Pasqal announced the successful deployment of Saudi Arabia's first quantum computer, and the Middle East's first quantum system dedicated to industrial applications, at Aramco's data centre in Dhahran, a pivotal milestone in the regional technology landscape.

The quantum computer, based on neutral-atom technology, was developed in partnership with Pasqal and represents a platform for advancing applications across energy, materials and industrial optimisation challenges.

This system can control 200 qubits in programmable two-dimensional arrays and is intended to support advanced quantum algorithms as well as training programmes and joint research opportunities for Saudi engineers and scientists, strengthening the Kingdom's quantum ecosystem and high-tech talent pipeline.

The partnership builds on earlier strategic investment by Wa'ed Ventures, Aramco's venture capital arm, which invested in Pasqal in January 2023 and has supported localisation of Pasqal's technologies and operations in Saudi Arabia.

This development aligns with Aramco's digital strategy to leverage advanced technologies to enhance operational efficiency, accelerate innovation and unlock value across its business portfolio.

The project not only represents a technological milestone but also illustrates the practical orientation of Saudi quantum deployment, focus-



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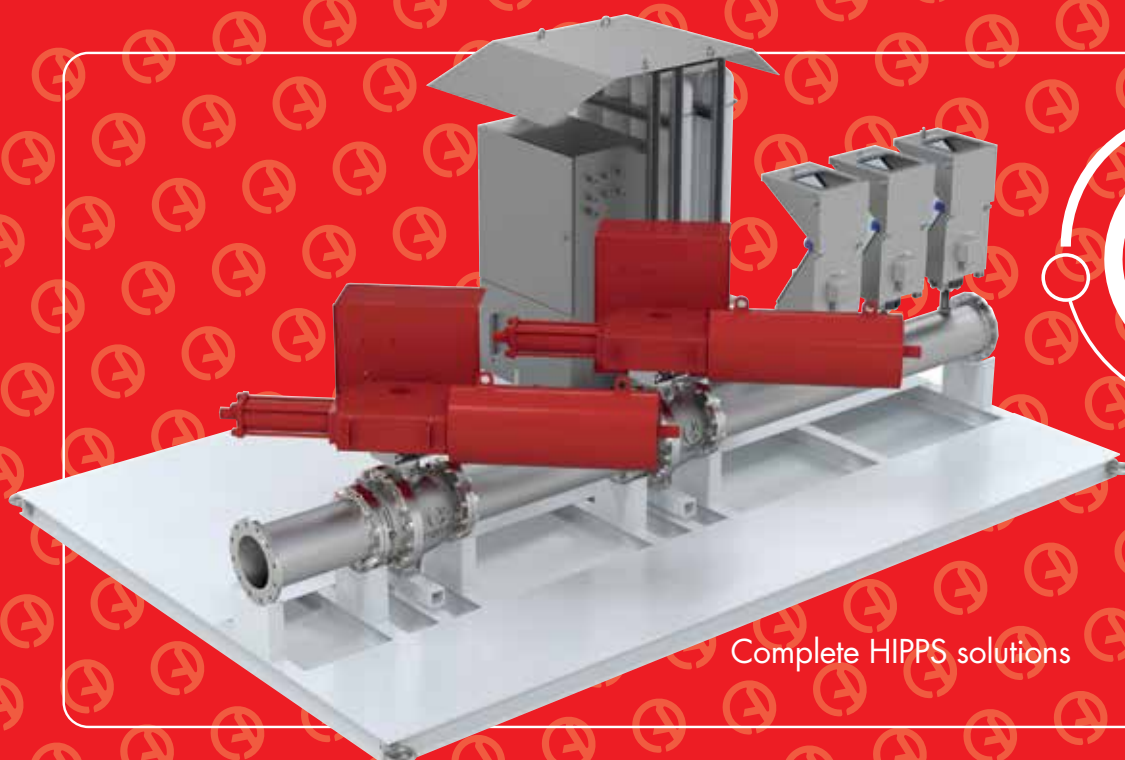
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Saudi Arabia accelerates strategic shift toward national quantum economy

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ing on near-term industrial impact rather than distant theoretical research alone.

Industrial quantum computing provides a framework for addressing complex optimisation problems that are pervasive in energy systems.

Legacy hydrocarbon extraction and upstream reservoir models involve extremely large parameter spaces that challenge classical supercomputers; quantum approaches can, in certain cases, explore these spaces simultaneously, offering potential acceleration of simulations and optimisation tasks.

In logistics and supply chain planning, quantum algorithms could enable faster route and resource allocation decisions, improving operational efficiency across sprawling energy infrastructure.

Furthermore, quantum-enhanced materials modelling can accelerate the discovery of catalysts and novel materials relevant to both hydrocarbon processing and emerging energy vectors such as hydrogen and advanced battery systems.

Beyond computing, quantum sensing technologies offer measurement precision that can exceed classical instrumentation.

For a resource-rich country with extensive geological exploration needs, quantum sensors could improve subsurface imaging and resource characterisation accuracy, potentially informing future critical minerals development, a sector of growing interest as global demand for battery and semiconductor materials increases.

The Kingdom's approach also recognises the

importance of secure communications in an era of accelerating digital exchange.

Quantum communication protocols offer theoretically unbreakable encryption, forming the backbone for future secure national infrastructure.

Pilot collaborations within flagship initiatives such as NEOM aim to integrate quantum encryption into smart city frameworks, reflecting an anticipatory stance toward cybersecurity challenges that could arise with quantum-capable adversaries.

DECISION DRIVERS, CHALLENGES & FORWARD IMPLICATIONS

Saudi Arabia's quantum strategy is driven by multiple considerations: Economic competitiveness, technology sovereignty, workforce development and integration within global value chains for emerging technologies.

Early adoption and capability building may attract international research partnerships, enhance foreign investment appeal and position the Kingdom as a regional hub for quantum innovation.

A structured national programme reduces risks associated with fragmented development and enables coherent governance of cross-sectoral demand signals. However, there remain inherent challenges.

Quantum hardware development requires extreme environmental conditions, specialised fabrication and precise control systems, presenting

barriers to rapid scaling.

Workforce shortages persist, as quantum engineering requires deep interdisciplinary expertise.

The proposed centralised infrastructure and talent pipelines aim to mitigate these constraints, yet sustaining momentum will require continuous investment and iterative policy calibration.

In the energy sector, quantum technology may initially contribute to efficiency improvements in established fossil fuel operations while driving innovation in new energy systems.

For example, simulations of hydrogen storage materials and renewable energy grid optimisation could benefit from quantum-enabled computation.

Similarly, quantum sensors may enhance environmental monitoring and emissions tracking, aligning with sustainability objectives.

Saudi Arabia's integration of quantum technologies within its industrial digital transformation mirrors broader global trends but is distinguished by the emphasis on near-term industrial applications and ecosystem building rather than purely academic advancement.

The Kingdom's efforts encompass talent development, infrastructure creation, international partnerships and pilot deployments, creating an integrated framework for future growth.

By embedding quantum technology within core economic sectors, Saudi Arabia seeks to ensure that emerging quantum capabilities contribute meaningfully to national competitiveness and technological resilience in the decades ahead. ■

JOSLOC to supply NANCO fleet with lubricants solutions

AL Jomaih and Shell Lubricating Oil Company (JOSLOC) and Al Nakhlah National Company (NANCO) have signed a strategic lubricants supply agreement.

Through this partnership, NANCO's extensive, diversified fleet will be supported by JOSLOC premium lubricant solutions, thereby strengthening operational efficiency, safety, and reliability across Saudi Arabia's transportation and logistics sectors.

The partnership aligns with the Kingdom's vision for enhanced logistical capabilities and robust infrastructure, ensuring that the vehicles and machinery driving development are supported by world-class technology and expertise.

The lubricants supply agreement between JOSLOC and NANCO covers the comprehensive supply of advanced lubricants for NANCO's fleet operations throughout Saudi Arabia.

Fahad Al Qahtani, CEO of JOSLOC, says: "This strategic partnership with NANCO, a leader in Saudi Arabia's transportation sector, highlights our shared values of quality and reliability. JOSLOC bring global technical expertise and a portfolio of premium lubricants engineered to protect engines, reduce operational costs, and enhance efficiency. We are fully committed to supporting NANCO's ambitious operations and contributing to their continued success, creating partnership-driven growth within the Kingdom."

Khalid Al Qahtani, Chairman of Board of Directors of NANCO, said: "Our operations are built on a foundation of safety, reliability and service to our customers and the nation. Choosing a partner for our lubricants supply is a decision that directly impacts our fleet's performance and our ability to deliver on our promises. This partnership is a strategic investment in our operational efficiency and fleet longevity, and we look forward to achieving new heights of performance together."



The agreement signing between JOSLOC and NANCO

As Saudi Arabia continues to strengthen its transportation and logistics industry, efficient mobility remains a key driver of growth and reliable service delivery.

For organisations managing large fleets, reliability and consistent performance are essential to keeping operations running smoothly and meeting commitments every day.

This partnership between JOSLOC and NANCO will be focused on delivering tangible value through enhanced fleet reliability, operational efficiency, and optimised maintenance performance. ■

Gulf doubles down as global sustainable debt markets retreat in 2026

The Middle East defied global trends with a 3pc increase in sustainable bond volumes and record sukuk issuance of \$11.4bn, positioning the GCC as the defining growth frontier for sustainable finance in 2026

BY ABDULAZIZ KHATTAK

WHILE sustainable debt markets cooled sharply across most of the world in 2025, the Middle East emerged as a conspicuous outlier, according to S&P Global Ratings' Sustainable Bonds Outlook 2026: Middle East Issuance Persists.

The region's labelled bond market grew approximately 3 per cent by volume against a global contraction of 21 per cent, underpinned by robust activity in Saudi Arabia and the UAE, and the sustained expansion of the sustainable sukuk segment.

With S&P projecting regional issuance of between \$20 billion and \$25 billion in 2026, the Gulf is entering the year not in consolidation mode, but with structural momentum.

Conventional bond issuance across Middle East corporates and financial institutions rose by 10-15 per cent to \$81.2 billion in 2025, providing a healthy backdrop.

Sustainable instruments now account for 24 per cent of total regional corporate and financial institution issuance, a share that continues to expand as the labelled market matures and diversifies across instrument types.

The contrast with global trends is stark: Where international markets pulled back, Saudi Arabia and the UAE drove growth that more than offset a significant decline in Türkiye, where sustainable bond issuance fell 50 per cent by volume and 23 per cent by value.

GREEN DOMINATES AS ENERGY TRANSITION ANCHORS PIPELINE

Green bonds remain the dominant instrument across the region, consistent with global conventions but with a distinctly Gulf character shaped by hydrocarbon economies seeking credible decarbonisation pathways.

Renewable energy tops the project category list in labelled issuances across the UAE, Saudi Arabia, and Türkiye, with energy efficiency, green buildings, sustainable water management, and clean transportation also featuring prominently.

Solar projects are particularly favoured in GCC countries given high levels of solar irradiance, and energy companies, such as Masdar in the UAE are expected to continue issuing green bonds to finance expanding renewable portfolios.



While global sustainable bonds issuance contracted by 21pc, the Middle East saw a 3pc increase

The most strategically significant project on the regional horizon is Saudi Arabia's planned commissioning in 2026 of what will be the world's largest utility-scale green hydrogen project in Neom, the Saudi Vision megaproject powered by photovoltaic solar, wind, and energy storage.

Saudi Electricity Company (SEC) issued a \$1.25-billion green sukuk in Q1 2025, while the Kingdom itself raised \$1.568 billion through a sovereign green bond in the same period, with an additional \$786 million green issuance also in Q1.

The Public Investment Fund (PIF) followed with two further green issuances of \$987 million and \$936 million in Q4 2025.

Saudi Arabia also issued a green bond framework in 2025 that explicitly included climate change adaptation in its use of proceeds, a notable broadening of eligible project categories that S&P expects other issuers to follow, given the region's pronounced exposure to physical climate risks.

Sustainable sukuk volumes reached a record \$11.4 billion in 2025, up from \$7.9 billion in 2024, with the instrument now constituting more than 45 per cent of regional sustainable bond issuance by value and more than 40 per cent by number of issuances, compared with 33 per cent and 24

per cent respectively at end-2024.

Saudi Arabia and the UAE continue to lead sukuk issuance, and guidance published by the International Capital Market Association (ICMA) in April 2024 has provided additional transparency to support continued market maturation.

NEW INSTRUMENTS RESHAPE THE LANDSCAPE

The regional market is not homogeneous, and Türkiye, Saudi Arabia, and the UAE account for more than 90 per cent of sustainable bond issuance across the Middle East. However, their market structures differ materially.

The UAE and Saudi Arabia together accounted for 80 per cent of 2025 sustainable bond issuance by value, with bonds the dominant instrument. Meanwhile, in Türkiye, sustainable loans, and not bonds, drive activity, with the country representing 60-65 per cent of the regional sustainable loan market by value.

Sectors with more challenging decarbonisation pathways, including non-renewable energy, transportation, and chemicals, are more prevalent in the loan market, while renewables and real estate issuers gravitate towards bonds.

Innovation in instrument design is accelerating. The launch of sustainability-linked loan financing bond

guidelines in June 2024 has already produced the first SLLB sukuk, issued by Emirates Islamic in 2025.

Blue bonds are gaining traction, particularly in the UAE. The First Abu Dhabi Bank issued the region's first blue bond by a financial institution in August 2025, and Emirates NBD raised \$1 billion through a dual-tranche blue (\$300 million) and green (\$700 million) issuance in January 2026, financing offshore wind, wetland and mangrove conservation, and flood-resilient infrastructure.

Transition bond labels are also emerging for issuers in the hydrocarbons value chain with credible transition strategies, including methane abatement projects.

On the regulatory side, the Saudi Capital Markets Authority (CMA) published guidelines for issuing labeled debt instruments in April 2025, broadly aligned with ICMA standards, while the UAE's Federal Decree Law No 11 of 2024 mandates all entities to measure, report, and reduce greenhouse gas emissions by May 2026.

Despite this momentum, S&P identifies persistent funding gaps in climate adaptation and water scarcity finance, areas that remain inadequately served by sustainable debt markets and where private and blended finance may need to play a larger role to close the structural deficit. ■

Kanoo Energy strengthening Kingdom's energy and industrial landscape

The company supports national development goals through integrated services, local workshops, and joint venture partnerships that provide reliable in-Kingdom support to industrial operators

WITH the ever-increasing pace of industrialisation in Saudi Arabia, under the Vision 2030 and In-Kingdom Total Value Add (iktva) initiatives, the requirement for credible and accessible engineering services has always been important.

With years of experience and a strong presence in the Kingdom, Kanoo Energy, a subdivision of Kanoo Industrial and Energy, a division under the Yusuf bin Ahmed Kanoo Company, remains an integral part of the Kingdom's oil and gas, power, utilities, and industrial sectors, providing comprehensive solutions, in-Kingdom workshops, and joint ventures.

The company has established a strong reputation for its commitment to service delivery in the most critical infrastructure sectors.

Its in-Kingdom business is in complete sync with the Kingdom's focus on localisation, efficiency, and sustainable industrial development.

INTEGRATED SERVICES FOR OIL & GAS, INDUSTRIAL SECTORS

The oil and gas service offerings of Kanoo Energy in Saudi Arabia include drilling operations support, flow control services, pump and compressor maintenance services, and energy management services.

The company, through its in-country capabilities, offers installation, maintenance, and upgrade services for valves, compressors, and process systems while supporting the operators with rental and retrofit services that optimise availability and reliability.

One of the company's key strengths lies in its Process Solutions Division, which offers engineered rental filtration skid packages for the industrial and energy sectors.

These skid packages are used during commissioning, shutdown, turnaround, and temporary operation phases to manage contamination and protect critical assets.

These filtration skid packages, designed for flexibility and rapid mobilisation across the Kingdom, support gas pipelines, hydrocarbon processes, MEG units, and power generation processes to ensure business continuity without capital expenditure.

In addition, Kanoo Energy is working in collaboration with international technology partners and joint ventures to enhance the provision of



Gas analysers are part of Kanoo Energy's integrated, in-Kingdom model

services within Kingdom borders.

Kanoo Energy has been manufacturing safety relief valves, pressure relief valves and tank valves under licensing agreement with Farris (a Curtiss-Wright company) and Groth Corp (a Baker Hughes company) over several years.

Similar licensing agreements have also been entered into with Dovianus (a Crane company) for manufacturing sampling systems.

ELECTRICAL & POWER INDUSTRY CAPABILITIES

Furthermore, Kanoo Energy offers a wide range of electrical services to help support the power and industrial sectors in Saudi Arabia.

With the expertise of qualified engineers and state-of-the-art testing equipment, the company can offer diagnostic, maintenance, and retrofit services for low, medium, and high-voltage applications.

The main capabilities include the replacement and retrofits of UPS systems and industrial battery chargers, supply and maintenance of transformers, oil filtration and regeneration services, and condition assessment of motors, cables, switchgear, and generators.

It also uses advanced partial discharge analysis and continuous monitoring to help detect potential problems early on, allowing clients to extend the life of their equipment and maintain system reliability.

Protection system upgrades and relay retrofits support the moderni-

sation and efficiency of industrial facilities.

Keeping in trend with the latest technologies, the division has made significant strides in the field of digitalisation with projects being executed with Saudi Aramco and Saudi Electricity Company.

LOCAL MANUFACTURING & JOINT VENTURES

In line with the localisation goals of iktva and Vision 2030, Kanoo Energy is working to enhance its presence in the Kingdom through joint ventures and partnerships.

Adage Kanoo industrial Company (AKIC), the joint venture of Kanoo Energy and Adage Automation based in Jubail Industrial City, delivers integrated gas analytical systems and local engineering support for industrial projects.

The facility supports analyser integration and project execution and remains aligned with IKTVA goals, with multiple projects underway along with its 9COM certification in progress.

Another significant development has been the JV formed with Unimech India to set up a precision machine shop in Dammam's industrial zone with API certification for remanufacturing and machining products for the upstream segment.

WORKFORCE SAFETY & INDUSTRIAL READINESS

Kanoo Energy is also committed to industrial safety needs with its work-

wear and PPE offerings.

Its Kanwear® line of customised safety workwear is designed for challenging environments in the oil and gas, petrochemicals, utilities, and heavy industries sectors.

These workwear items incorporate the latest fabric technology and international safety standards, providing durability, comfort, and safety for industrial workers.

Some product lines are locally manufactured in the Kingdom, furthering localisation initiatives and ensuring a steady supply for large-scale projects.

The company also supports work-at-height safety requirements through height-safety solutions and site-based access to protective equipment, helping industrial operators maintain safe working conditions during routine and critical operations.

Kanoo Energy has supplied more than 20,000 fall-protection equipment specifications for offshore and onshore rigs, petrochemical plants, and refineries across the Kingdom.

Through its OEM-approved service and repair facility for DBI-SALA® and PROTECTA® equipment, the company maintains the capacity to service 400-500 height-safety units per month, with 24/7 operational support for critical onshore and offshore activities.

As an authorised supplier and service provider for 3M height-safety equipment in Saudi Arabia, Kanoo Energy provides onsite PPE store solutions, inventory management, and procurement support to ensure equipment availability, reduce downtime, maintain compliance, and support workforce safety across operations.

SUPPORTING THE KINGDOM'S INDUSTRIAL FUTURE

As Saudi Arabia continues to expand its industrial and energy infrastructure, Kanoo Energy supports national development goals through integrated services, local workshops, and joint venture partnerships that provide reliable in-Kingdom support to industrial operators.

From process filtration and electrical diagnostics services to safety solutions, its localised capabilities help clients operate efficiently and safely, positioning the company to contribute to the Kingdom's evolving energy and industrial landscape. ■

ALUPCO® & Schüco Middle East Strategic Fire & Safety Alliance

ALUPCO® (Aluminium Products Company) and Schüco Middle East have officially signed a Memorandum of Understanding (MoU) for Fire and Safety Products. The agreement was signed by Mr. Khaled Abdel Moneim, CEO of ALUPCO®, and Mr. Ammar Alul, CEO RHQ – MENA, Schüco International KG.

This strategic partnership strengthens both companies' commitment to innovation, advanced safety standards, and high-performance building solutions—driving excellence and elevating safety across the built environment.



Your partner throughout the entire lifecycle of the building envelope



Our Products

- ✓ Fire rated windows, doors, partitions and façade (Aluminum & steel)
- ✓ Bullet / blast resistant windows, doors and façade.
- ✓ Aluminum Internal partitions with acoustic performance



Kingdom's Fourth Industrial Revolution engine to reshape economic strategy

The innovation hub drives governance frameworks, smart industrialisation, and 4IR-powered economic diversification aligned with Vision 2030 goals

BY ABDULAZIZ KHATTAK

AN ambitious national initiative is steering Saudi Arabia's economic diversification with an accelerated focus on Fourth Industrial Revolution (4IR) technologies.

The Centre for the Fourth Industrial Revolution Saudi Arabia (C4IR Saudi Arabia) was established as a strategic platform to guide the Kingdom's adoption of emerging technologies, broker multi-stakeholder collaboration, and co-design governance frameworks for digital transformation across public and private sectors.

As an affiliate of the World Economic Forum (WEF) hosted by the King Abdulaziz City for Science and Technology (KACST), the centre occupies a central role in shaping how advanced technologies such as artificial intelligence (AI), quantum computing, autonomous systems and smart infrastructure are responsibly integrated into national development strategies.

C4IR Saudi Arabia emerged against the backdrop of Saudi Vision 2030, which emphasises economic diversification, knowledge-based growth, and technological leadership.

Formally established in 2020 within KACST's institutional framework, the centre operates at the interface of government policy, industry adoption, and international best practice exchanges.

It was officially inaugurated in 2021.

The centre's foundational concept rests on co-creating practical, scalable protocols for the governance and adoption of frontier technologies, ensuring that innovation is scaled efficiently while societal risks are mitigated.

NATIONAL PLATFORM FOR INDUSTRIAL & TECHNOLOGICAL TRANSFORMATION

C4IR Saudi Arabia's role extends beyond thought leadership to concrete multi-sector engagement through high-impact forums, partnerships, and initiatives that anchor future technologies in the Kingdom's economic fabric.

A flagship expression of its work is the annual Saudi Forum for the Fourth Industrial Revolution, a high-profile event that convenes government officials, industry leaders, researchers and international partners to explore the impacts of 4IR technologies on industrial com-



4IR will be pivotal in helping the Kingdom's economy transition from resource dependency toward diversified, technology-enabled

petitiveness, economic strategy and societal adaptation.

The third edition of this forum, held in Riyadh in October 2025 under the theme "Frontiers of Global Technology", featured more than 90 local and global speakers, more than 25 panel discussions and specialised workshops spanning six thematic pillars, including strategic resources for the 4IR economy, responsible technology deployment, and preparing society for future technological shifts.

Concrete outputs at this forum included strategic agreements and announcements to strengthen Saudi Arabia's innovation ecosystem, as well as digital tools designed to underpin the transformation of small and medium enterprises (SMEs).

One prominent initiative launched alongside the forum was PeerLink, a digital platform intended to facilitate peer-to-peer collaboration, knowledge exchange and resource access for SMEs navigating the digital transition.

C4IR Saudi Arabia also hosts sector-specific workshops and programmes throughout the year.

Examples from 2025 include an advanced air mobility workshop to develop a National Advanced Air Mobility playbook, a scientific re-

search hackathon at King Saud University designed to channel student innovation into practical solutions, and a series of "Quantum Nexus" webinars exploring the transformative potential of quantum materials and computing.

Central to the centre's portfolio is its advocacy for pilots and frameworks that can be embedded into national industrial, urban and policy landscapes.

C4IR Saudi Arabia stewards comprehensive discussions around governance principles for complex technologies, bringing together ecosystem actors to assess opportunities and regulatory considerations in areas such as smart manufacturing and digital infrastructure.

DRIVING ECONOMIC DIVERSIFICATION THROUGH SMART INDUSTRY & EMERGING TECHNOLOGIES

C4IR Saudi Arabia's activities align directly with Saudi Arabia's broader economic goals of industrial modernisation and diversification.

A key programme championed in conjunction with the forum and relevant ministries focuses on upgrading more than 4,000 traditional factories into smart, AI-powered facilities that leverage automation,

3D printing and advanced analytics, signalling a shift from conventional manufacturing toward future-ready industries.

This initiative underscores the centre's role in catalysing tangible industrial transformation rather than merely conceptual policy discourse.

The centre's emphasis on 4IR technologies has palpable economic implications. At the 2025 forum, Børge Brende, President, WEF, highlighted that AI alone could contribute approximately 12 per cent to Saudi Arabia's GDP by 2030, a figure that reinforces the economic urgency of integrating digital technologies across sectors.

Operationally, C4IR Saudi Arabia contributes to the development of governance frameworks to facilitate technology deployment at scale while mitigating risk exposure.

Through collaborative programmes with industry partners, the centre supports localisation of industrial technologies, enhancement of workforce skills, and the creation of regulatory environments that attract foreign investment.

In 2024, for example, its activities directly benefited more than 150 SMEs and reached over three mil-





كانو للطاقة

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lion people, establishing a baseline for expanded impact into 2025 and beyond.

C4IR Saudi Arabia's work also intersects with the establishment of new strategic infrastructure. Its engagement in advanced mobility planning, quantum computing discourse, and smart city frameworks reflects broader national ambitions to diversify economic output beyond hydrocarbons.

Events such as World Quantum Day, hosted by C4IR Saudi Arabia to commemorate global milestones in quantum science, further signal the Kingdom's intent to integrate cutting-edge research and development into its national growth trajectory.

IMPACT ON THE ENERGY LANDSCAPE & FUTURE OUTLOOK

The fourth industrial revolution has pronounced impacts on Saudi Arabia's energy sector, where legacy fossil fuel operations intersect with emerging energy sources and digi-

tal innovation.

While Saudi Arabia remains a major oil and gas producer, C4IR Saudi Arabia's work contributes to diversifying energy value chains by embedding digital competencies such as AI and automation into energy production, distribution and efficiency frameworks.

These technologies have potential implications for optimising hydrocarbon operations, reducing operational costs and enhancing predictive maintenance capacities across energy assets, although specific quantified impacts are developed through sector engagements rather than broad public statistics.

Emerging energy sectors also stand to benefit from C4IR-guided innovation. The application of IoT, AI and advanced analytics in renewable energy optimisation, grid management and energy storage systems can improve efficiency and integration of distributed energy resources.

Moreover, the centre's focus on

quantum computing and advanced materials research points to future opportunities to accelerate breakthroughs in energy materials, battery technologies and computational modelling that could enhance performance across energy systems.

In parallel, critical minerals sectors tied to energy transition technology supply chains are implicated in the centre's thematic discussions.

Workshops and forums address strategic resources for the 4IR economy, encompassing critical minerals necessary for semiconductors, advanced batteries and digital infrastructure.

These conversations help align mining, processing and supply value chains with national economic priorities, although concrete project details vary across industry collaborations rather than centre-specific publications.

Looking ahead, C4IR Saudi Arabia's work is expected to deepen as Saudi Arabia continues to position itself as

a regional hub for technology and innovation.

Future growth is likely to be shaped by expanding global partnerships, scaling pilot programmes into operational deployments, and strengthening capability-building across public and private sectors.

The centre's role in shaping governance protocols for autonomous systems, smart industries and digital cities will be central as sectors such as energy, manufacturing and logistics undergo paradigm shifts driven by 4IR technologies.

By anchoring technological adoption with governance integrity and cross-sector collaboration, C4IR Saudi Arabia is playing a pivotal role in transitioning the Kingdom's economy from resource dependency toward diversified, technology-enabled growth.

Its initiatives underscore a strategic recalibration of national priorities that elevates innovation as a core driver of competitiveness and societal transformation in the digital age. ■

LOBO brings modular work-at-height systems to Saudi Arabia's industrial sector

LOBO Systems, a UK-based work platform systems manufacturer, has forayed into the Saudi market with its first deployment in the Kingdom, marking a significant milestone in the continued international expansion and formal entry into the Middle East industrial market.

The project, delivered to a major global industrial engineering organisation operating in Riyadh, reflects growing regional demand for safer, more flexible and more controllable work-at-height solutions across complex industrial environments.

Saudi Arabia continues to invest heavily in infrastructure, energy, water treatment and advanced manufacturing as part of its long-term economic development strategy.

These sectors rely on safe and efficient maintenance of pumps, processing systems and elevated equipment, often within space-restricted and operationally sensitive facilities.

Traditional access methods such as outsourced scaffolding can introduce delays, increase operational disruption and limit maintenance responsiveness.

Fixed access platforms, while effective in static environments, may lack the adaptability required in evolving industrial settings.

LOBO's modular work-at-height platform system provides an alternative approach.

Designed to be assembled without tools, the system enables trained in-house teams to build fully enclosed, compliant working platforms on demand.

Platforms can be configured around pipework, processing equipment and restricted workspaces, then reconfigured as operational requirements change.

By enabling internal ownership and control of access infrastructure, organisations benefit from reduced reliance on third-party contractors; faster response to planned and unplanned maintenance; greater operational control; long-term cost efficiency; and a future-proof solution as



LOBO's work platform system reduces reliance on third-party contractors

plant layouts evolves.

Commenting on the development, Rob Bokros, CEO at LOBO Systems, says: "Industrial operators globally are seeking greater control over how they manage work at height. Entering the Saudi market reflects increasing recognition that access infra-

structure should be adaptable, owned and immediately available to internal teams. As investment accelerates across the Middle East, we are proud to support organisations looking to modernise their maintenance processes while maintaining the highest safety standards." ■

AMPO delivers engineered valve solutions to energy sector globally

From offshore developments to LNG, refining and mining upgrades worldwide, AMPO demonstrates integrated engineering capability, materials expertise and certified performance across severe service environments

AMPO POYAM VALVES (AMPO) continues to consolidate its position as a supplier of highly engineered valve systems across upstream, midstream and downstream energy and mining projects worldwide.

Recent deliveries spanning Saudi Arabia, Brazil, China, the US and Kazakhstan illustrate a portfolio defined by long design life, materials science expertise, severe service capability and integrated engineering support.

SUBSEA ENGINEERING BENCHMARKS IN KSA

In the Arabian Gulf, AMPO supplied several high-rating and large sized MRO valves for Aramco's maintenance, refurbishment, and upgrade projects across its refineries and pipelines.

The order includes high-rating large-sized valves for sour service, such as 46-inch-600#, 40-inch, Class 600 and 30-inch, Class 600 ball valves, and a substantial package of 6-inch, Class 900 gate valves, most of them with IN625 weld overlay.

These valves have been specifically designed to operate under the demanding conditions of Aramco's facilities, ensuring safety, reliability, and compliance with Aramco's SAMSS and IOGP standards.

AMPO also supplied critical subsea valves for two major offshore programmes led by Saudi Aramco.

For the CRPO 125 and 126 developments at the Abu Safah and Marjan fields, operated by Aramco with Lamprell as contractor, the scope covered two ABSF jackets and two production deck modules (PDMs) with associated subsea facilities.

The specification required valves capable of meeting API 6DSS while achieving a 50-year design life under aggressive offshore conditions.

AMPO delivered four 12-inch, Class 1500 subsea valves: Two hydraulically actuated top-entry ball valves, one manual top-entry ball valve and one manual subsea swing check valve, all with ring-type joint connections.

The ball valves were equipped with compact hydraulic actuators and configured in SPE/DPE arrangement.

Internally, the valves were clad with Alloy 625 weld overlay, enhancing resistance to corrosion and ensuring durability over extended subsea service.

A second subsea package was executed for the CRPO 82 and 83 projects at the Zuluf AH East and West oil fields, where new wellhead topsides, tie-in platforms and electrical distribution platforms were constructed.

For this project, AMPO supplied several 10-inch, Class 1500 gear-operated subsea swing check valves featuring a Class 4 ISO 13628-8 interface.

As with the earlier package, the valves incorporated Alloy 625 weld overlay to safeguard long-term performance in harsh marine environments while satisfying API 6DSS design criteria and 50-year life expectations.

SEVERE SERVICE & SMART INTEGRATION

Beyond the Arabian Gulf, AMPO's offshore credentials were reinforced through deliveries to Brazil's pre-salt sector.

For the P-84 (Atapu) and P-85 (Sepia) FPSO platforms operated by Petrobras, AMPO supplied eight



AMPO's advanced engineering capabilities make its solutions uniquely suited for Aramco's projects

20-inch, Class 150 Duplex axial flow check valves.

Installed downstream of critical pumps, the valves protect against reverse pressure in the pipeline, a key requirement in floating production systems processing up to 225,000 barrels of oil per day and 10 million cu m of gas.

In Brazil's mining sector, AMPO delivered an integrated severe service package to Samarco's Germano Mine in Minas Gerais as part of the Momento 2 Filtragem Fase 2 renewal.

The project included 82 severe service ball valves up to 14 inches and two hydraulic power units (HPUs) engineered and manufactured in-house.

All valve flow paths and closure elements were coated with chromium carbide using HVOF technology to withstand abrasive service in tailings filtration.

The HPUs, developed by AMPO's R&D team, formed part of its Integrated Smart Solutions approach, enabling automated and reliable valve actuation. Field service engineers supported installation, commissioning and operator training, aligning the valve package with Samarco's objective of increasing dry stacking of tailings to 80 per cent.

Cryogenic performance has also featured prominently in AMPO's recent portfolio. For the Caofeidian Xintian LNG Receiving Terminal in Hebei Province, China, the company supplied more than 200 cryogenic valves across three construction phases between 2022 and 2025.

The scope included a 32-inch, Class 1500 top-entry cryogenic ball valve installed in the regasification unit, alongside gate, globe and axial flow check valves up to 26-inch, Class 150 and 14-inch, Class 1500 ratings.

AMPO's field engineering team provided on-site commissioning and start-up assistance, supporting safe integration into a facility designed to unload 12 million tonnes of LNG annually and equipped with

twenty 200,000 cu m storage tanks.

In the US, AMPO completed a customised switch plug valve solution for a major Northeast refinery processing 144,000 barrels per day (bpd).

Installed in the Delayed Coker Unit, the 12-inch, Class 600 valve, manufactured in special alloy, performs high-temperature flow diversion between coke drums, a safety-critical function.

The package incorporated a fully engineered control panel with double redundancy, including a real-time plug position encoder and limit switches, ensuring seamless communication with the control room.

The entire assembly underwent final acceptance testing prior to shipment, followed by on-site installation and commissioning support.

After one year of operation, the system has maintained stable performance in continuous service.

In Kazakhstan, AMPO supplied 82 8-inch Hypercentric triple-offset ball valves for a metering station upgrade at Tengizchevroil.

The valves, equipped with electric actuators and Inconel overlay, comply with API 6D and passed PR2 testing.

A 6,000-cycle endurance test certified by DNV validated durability under extensive cycling.

Designed for high H₂S content and erosive conditions, the friction-free seat arrangement limits wear by ensuring contact only at final closure, while the independent lower trunnion prevents particle accumulation.

Local support was delivered through AMPO's hub in Atyrau, reinforcing lifecycle service capability in the Caspian region.

Across these projects, recurring themes include corrosion-resistant cladding, advanced coatings, compliance with API, ISO, ABS, TSG and DNV certification regimes, and in-house engineering of actuators and control systems. ■