FEBRUARY 2025

OGN

OIL, GAS, PETROCHEMICALS & RENEWABLES

BAHRAIN

TRANSFORMING ENERGY SECTOR

- Process Control, Instrumentation & Automation
- Separation & Filtration Technology • Leadership Perspective

Meet Your Connection to Reliable Results

A strong bottom line starts with consistency at the process line.

That's why your team relies on him.

With his guidance, they feel confident that they can trust their fluid sampling equipment and meet their operating targets, keeping your plant profitable.

Put our team alongside yours.

Swagelok Saudi Arabia

Leverage the expertise of our local Engineering team to help optimize your fluid systems. Connect with Swagelok Saudi Arabia at 966 133 570 100, email info@ksa.swagelok.com, or visit saudiarabia.swagelok.com.

Swagelok®

OGN
OIL, GAS, PETROCHEMICALS & RENEWABLES

www.ognnews.com A component of www.tradearabia.com TradeArabia BUSINESS NEWS INFORMATION FEBRUARY 2025 Vol. 42 No.2 Reg No. 1 OGN 025

Making strategic shift to renewables
Bahrain and fellow GCC nations are embracing renewable energy, hydrogen, and technological innovation to transition beyond oil reliance by 2050, says Pablo Avogadri – Page 6

IoT revolutionising ops in oil and gas
IoT technologies boost efficiency, safety, and sustainability in oil and gas, while helping overcome challenges like harsh environments and cybersecurity risks – Page 11

Harnessing wasted energy
The energy transition depends on technology and commitment to sustainability, doing more with less, and uncovering value in unexpected places, says Freddie Sarhan – Page 13

FUELLING THE FUTURE: KSA FIRM ON GROWTH, STABLE SUPPLY

DAVOS: Saudi Arabia has insisted that the global energy demand is surging, and the kingdom remains focused on ensuring efficient and reliable supplies to address it.

Speaking at the World Economic Forum in Davos, Saudi Arabia's Minister of Economy and Planning, Faisal Alibrahim, reiterated the country's commitment, alongside OPEC, to stabilising global energy markets and meeting growing demand without compromising efforts to tackle climate change.

Alibrahim's remarks come in the wake of US President Donald Trump's call for Saudi Arabia and OPEC to lower oil prices. "If the price came down, the Russia-Ukraine war would end immediately. Right now, the price is high enough that that war will continue – you got to bring down the oil price," Trump said, addressing WEF delegates via video link. He added, "We will negotiate with Saudi Arabia to lower oil prices."

While not directly addressing Trump's comments, Alibrahim responded: "Energy supply and energy security are essential for global growth and prosperity. The kingdom's position, and OPEC's position, is all about ensuring long-term market stability, making sure there is enough supply to meet the growing demand." He emphasized the inevitability of rising demand, whether in the US driven by AI or globally, noting: "We must supply energy efficiently while using technology and collaboration to combat climate change, which is a serious challenge."

He highlighted Saudi Arabia's unique position as one of the most heat- and drought-stressed nations, reinforcing the kingdom's commitment to climate action. However, he cautioned against measures that hinder developing and emerging economies from accessing energy resources equitably.

Faisal Alibrahim speaks at a World Economic Forum session

"Saudi Arabia is on the front lines. We are serious about climate action but remain committed to ensuring fair access to energy for developing and emerging countries," the minister added.

The kingdom's position, he noted, is focused on balancing long-term supply security with the adoption of innovative solutions to tackle environmental challenges.

"Saudi Arabia is serious about climate action, but we cannot afford to jeopardise energy supply or fair access to energy for developing and emerging countries," he added.

At a session titled *All Hands On Deck for the Energy Transition*, Fatih Birol, Executive Director of the IEA, asserted that well-designed energy transition policies could ensure energy security, lower prices, and promote prosperity while creating jobs. "To antagonize these two important objectives for human beings today is, in my opinion, misleading. We can do both, we have done many things like that before in the world – and this is critical," Birol stated.

Demand growth will stay steady: Opec

LONDON: OPEC has forecast that world oil demand in 2026 will rise at a similar rate to this year, while reducing its figure for 2024 for a sixth time, following economic weakness in China, the world's biggest importer of oil.

The 2026 forecast is in line with the Opec's view oil use will rise for the next two decades, in contrast to the West's International Energy Agency (IEA) that predicts it will peak this decade as the world shifts to cleaner energy.

OPEC said demand will rise by 1.43 million barrels per day in 2026, a similar rate to the growth of 1.45 million bpd expected this year. The IEA forecast slower world oil demand growth in 2025 of 1.05 million bpd.

The report put 2024 demand growth at 1.5 million bpd, compared with 1.61 million bpd listed in December report.

Honeywell, Petro Rabigh sign MoU

DHAHRAN: Petro Rabigh and Honeywell have signed a memorandum of understanding (MoU) to explore the deployment of Honeywell UOP's naphtha-to-ethane-and-propane (NEP) technology.

The signing ceremony, held under the patronage of the Ministry of Energy, was sponsored by Eng Ahmed Al-Zahrani, Assistant Minister for Development and Excellence at the Ministry of Energy.

The non-binding MoU represents a significant milestone in leveraging advanced technologies to transform butane and naphtha into high-value feedstocks for light olefin production, such as ethylene and propylene, Honeywell said.

This collaboration aims to demonstrate and commercialise the innovative NEP technology, enhancing productivity, operational efficiency, and sustainability through the production of value-added petrochemical products from crude oil, it said.

The initiative aligns with the goals of Saudi Vision 2030 to drive innovation in the energy sector, promote liquid-to-chemical (LTC) processes, and improve energy efficiency and economic resilience.

Petro Rabigh is the largest integrated refinery and petrochemical complex in Saudi Arabia, producing fuels and high-value petrochemical products. Honeywell has been a key player in the region for over 70 years, delivering cutting-edge solutions.

Bahrain committed to energy transition

MANAMA: Bahrain's commitment to advancing its energy transition through innovation and strategic partnerships has been highlighted by Shaikh Nasser bin Hamad Al Khalifa, Representative of HM the King for Humanitarian Work and Youth Affairs, and Chairman of Bapco Energies.

He underscored Bapco Energies' dedication to fostering development, innovation, and the adoption of modern technologies to support the growth of key sectors.

The comments came during his meeting with Ezra Yacoub, Chairman and CEO of EOG Resources. The meeting was attended by Mark Thomas, Group CEO of Bapco Energies; Faisal Al Mahroos, Chairman of Bapco Exploration and Production; and Johann Pleininger, CEO of Bapco Upstream.


Shaikh Nasser bin Hamad Al Khalifa receives Ezra Yacoub together with senior executives

Shaikh Nasser emphasised Bahrain's ongoing collaboration with global energy leaders to establish sustainable partnerships that support the national economy, enhance infrastructure, and optimise natural resources, in line with Bahrain's Economic Vision 2030.

Shaikh Nasser noted that the energy sector is undergoing a significant transformation, focused on achieving energy security and fostering sustainable development through initiatives aimed at attracting foreign investment.

BAHRAIN REVIEW – Pg 2 to 7

He added that these efforts are guided by Bahrain's national energy strategy and Bapco Energies' operational plans, developed in coordination with relevant entities.

Shaikh Nasser further highlighted the importance of regional competition in attracting investments and strengthening economic integration, particularly in sectors such as oil and gas.

Kuwait makes large discovery

KUWAIT: Kuwait Oil Company (KOC) said it has made a discovery "of large commercial volumes of hydrocarbons" at Al-Jlaiaa offshore field estimated at 800 million of medium-density oil barrels and 600 billion standard cubic feet of associated gas, state news agency (KUNA) reported.

BAHRAIN: BALANCING LEGACY & SUSTAINABILITY

Recognising the evolving global energy landscape, Bahrain has invested in the modernisation of its hydrocarbons infrastructure to remain competitive

Inside

Bahrain Review

For more news and features, visit
www.ognnews.com

His Majesty King Hamad inaugurates BMP

By ABDULAZIZ KHATTAK

THE Kingdom of Bahrain is entering a transformative era in its energy sector, marked by ambitious modernisation projects, renewable energy initiatives, and a steadfast commitment to sustainability.

While oil continues to be a critical pillar of the nation's economy, Bahrain is proactively diversifying its energy mix to align with its Vision 2030 and achieve its ambitious goal of net-zero carbon emissions by 2060.

With groundbreaking projects and forward-looking policies, Bahrain is positioning itself as a leader in the energy transition across the Gulf region.

A LEGACY OF OIL & MODERNISATION

Oil has long been the backbone of Bahrain's economy, contributing more than 70 per cent of government revenues. While Bahrain is the smallest oil producer among GCC countries, it has consistently leveraged its strategic position and resources to maintain economic stability.

The onshore Bahrain Field and offshore Abu Safah Field, shared with Saudi Arabia, remain central to the country's production, with significant contributions from Abu Safah under an arrangement with Saudi Aramco.

Moreover, the discovery of the Khalij Al-Bahrain reservoir in 2018, which holds an estimated 80 billion barrels of tight oil, has reinvigorated the country's exploration efforts and bolstered its long-term resource outlook.

Recognising the evolving global energy landscape, Bahrain has invested in the modernisation of its hydrocarbons infrastructure to remain competitive.

The Bapco Modernisation Programme (BMP), a $7 billion project, stands out as one of the most significant investments in the country's energy sector.

This initiative has expanded the refining capacity of Bahrain's main refinery from 267,000 barrels per day (bpd) to 400,000 bpd. It will also enable the processing of a broader range of crude oils, improve operational efficiency, and meet stringent environmental standards.

Mark Thomas, CEO of Bapco Energies, highlighted the strategic importance of the BMP, stating: "By modernising our refinery, we are not only elevating Bahrain's energy infrastructure but also setting new benchmarks in environmental responsibility and competitiveness."

This project will ensure that Bahrain's oil sector remains a vital component of the economy while aligning with global trends toward sustainable practices.

To further enhance efficiency, Bahrain has embraced advanced technologies stemming from the Fourth Industrial Revolution (4IR).

Bapco Upstream, a key player in the sector, has implemented artificial intelligence (AI), big data, and the Internet of Things (IoT) to optimise operations.

For instance, its cloud-based big data platform enables predictive maintenance, helping to avoid costly operational disruptions. These advancements ensure that Bahrain's energy sector remains competitive while contributing to environmental goals.

DRIVING ENERGY TRANSITION

Bahrain's transition from an oil-reliant economy to a diversified energy landscape is spearheaded by Bapco Energies, an integrated energy company with operations spanning upstream, midstream, and downstream sectors.

Under the leadership of His Highness Shaikh Nasser bin Hamad Al Khalifa, the company has taken bold steps toward integrating renewable energy and decarbonisation into the Kingdom's energy strategy.

One of the most notable projects is Bapco Energies' partnership with Masdar, the UAE's leading renewable energy company, to develop wind farms with a potential capacity of 2 gigawatts (GW).

These wind farms, the first of their kind in Bahrain and the Middle East, will support the decarbonisation of critical industrial sectors while contributing significantly to the Kingdom's renewable energy goals.

This initiative underscores Bahrain's commitment to fostering regional collaboration and leveraging international expertise to achieve sustainability.

Bahrain's National Energy Strategy sets clear targets to support the Kingdom's net-zero goal by 2060. These include a 30 per cent reduction in carbon emissions by 2035 and the production of 710 megawatts (MW) from renewable energy sources within the same timeframe.

The Sustainable Energy Authority (SEA), established in 2019, plays a pivotal role in these efforts, focusing on solar, wind, and waste-to-energy projects. SEA's initiatives aim to integrate renewable energy into Bahrain's power grid, reduce reliance on fossil fuels, and enhance energy efficiency.

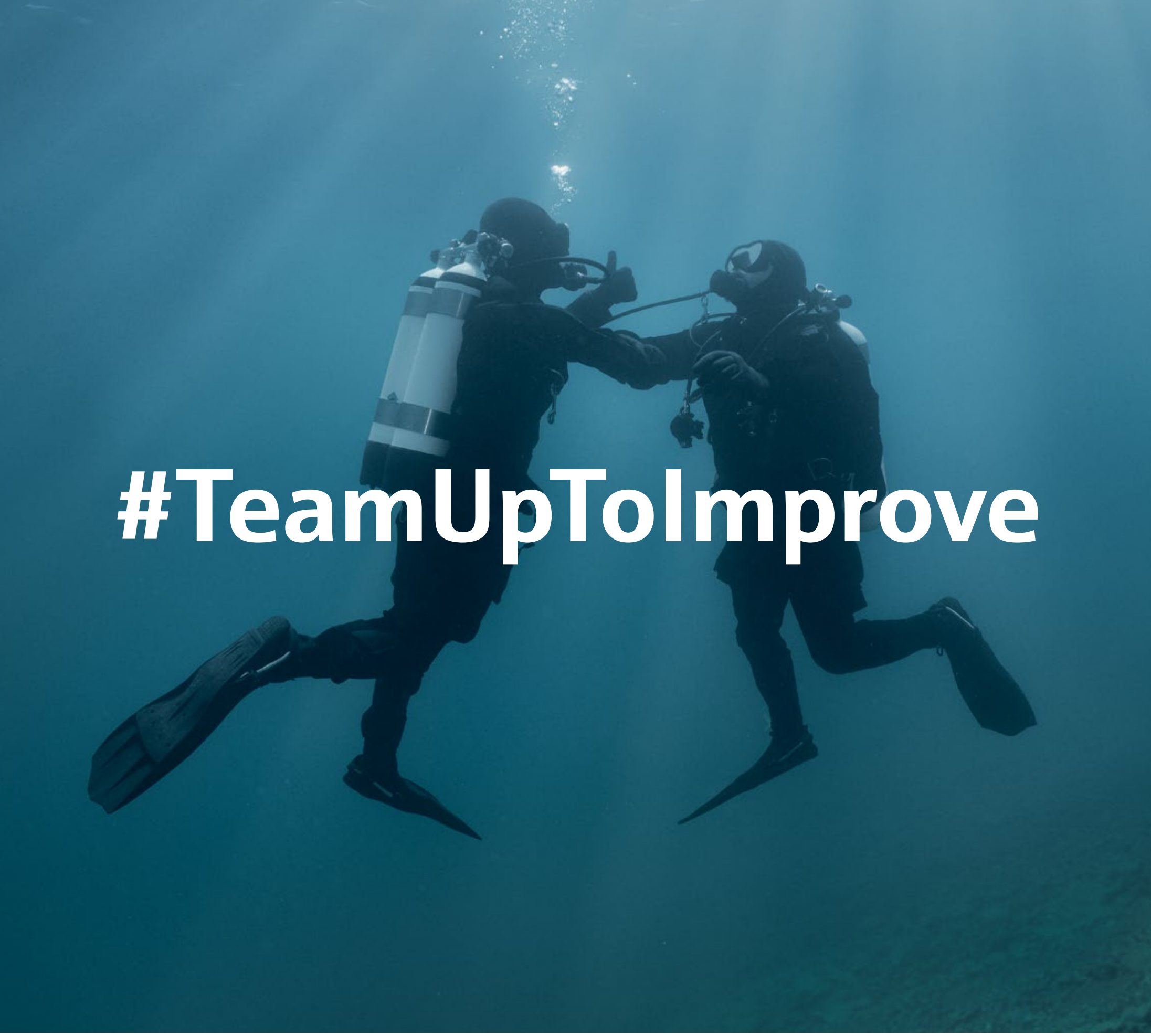
In addition to renewable projects, Bahrain is investing in the expansion of its electricity and water infrastructure.

The Sitra Independent Power and Water Plant and the Hidd Water Production Plant, set for completion by 2029, are key components of this strategy. These facilities will enhance production capacity while incorporating advanced technologies to improve efficiency and reduce greenhouse gas emissions.

Kamal bin Ahmed Mohammed, President of the Electricity and Water Authority (EWA), emphasised that these projects reflect Bahrain's commitment to sustainability and its readiness to meet growing urban and industrial demands.

Carbon capture and storage (CCS) technology is also gaining traction in Bahrain. With its concentrated industrial footprint and abundance of spent oil reservoirs, the Kingdom is well-positioned to deploy CCS solutions across its energy

Continued on page 4



Process improvement is like diving.
You need a reliable partner to count on.

Just as athletes rely on their teammates, we know that partnering with our customers brings the same level of support and dependability in the area of manufacturing productivity. Together, we can overcome challenges and achieve a shared goal; optimizing processes with regards to economic efficiency, safety and environmental protection. Let‘s improve together.

Do you want to learn more?
www.mesc.endress.com

Endress+Hauser
People for Process Automation

BMP facilities deploy latest tech to enhance efficiency

The Bapco Modernization Project (BMP) increases the company's refining capacity, enhances the product slate, improves energy efficiency, while ensuring environmental compliance

THE Bapco Modernization Project (BMP), one of the largest energy initiatives in the history of Bahrain, represents the most significant capital investment in Bapco Refining's 90-year history.

This multi-billion-dollar project prepares Bahrain for the evolving energy landscape.

At its peak, the BMP has involved more than 20,000 contractors and represents a transformative step for Bapco Refining. By enabling higher throughput, improving product quality, and ensuring compliance with environmental standards, the BMP aligns with Bahrain's Vision 2030 and strengthens the company's competitiveness in the global energy market.

OBJECTIVES OF THE BMP

The BMP will increase the company's refining capacity, enhance the product slate, improve energy efficiency, and ensure environmental compliance.

The refinery's crude capacity will rise by 42 percent, reaching 400,000 barrels per day, while the Resid Hydrocracking Unit (RHCU) will convert 78 per cent of lower-grade feedstock into high-value distillates, such as diesel and kerosene. Additionally, the project will improve the Energy Efficiency Index (EII) through the introduction of new, efficient units and the decommissioning of older facilities.

RESID HYDROCRACKING UNIT

One of the key units of the BMP is a Resid Hydrocracking Unit (1RHCU) which is powered by technology licensed from Chevron Lummus Global (CLG). The BMP has built a two-train RHCU with a capacity of 65,000bpd.

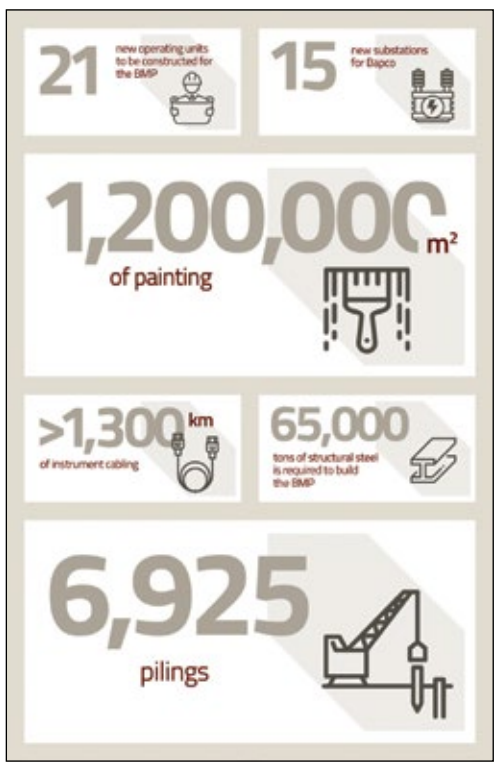
Less than a dozen of these units exists globally, and Bapco's 1RHCU will be among the largest on the planet. The plot size for 1RHCU is expected to be approximately 260m x 260m – that is, equivalent to almost 10 football pitches.

The RHCU will convert 78 per cent of the vacuum resid feed into intermediate products (distillates) which will then be further processed into high margin kerosene and diesel.

NEW CRUDE AND VACCUM UNIT (7CDU/7VDU)

The refinery includes 7 Crude Distillation Unit (7CDU) and Vacuum Distillation Unit (7VDU) as part of BMP's comprehensive upgrade of Bapco's facilities. This new state-of-the-art 225,000 bpd integrated crude and vacuum unit replaces 1,2,3 CDU and 1,3 VDU, which served Bapco for over 80 years. The units provide the required feedstock for further downstream processing.

The Bapco Modernization Project ensures environmental compliance



The units are designed to maximise output with minimum amount of energy while optimising yield performance, and thus fulfilling a key BMP objective. The units increase crude output by +42 per cent of the existing refining capacity. The crude column is 160' tall and has 34' - 9" diameter. The vacuum column is 142 feet tall and has a diameter of 37' – 1" at its widest point. The new AB4 pipeline from Saudi Arabia will supply higher levels of crude oil to meet the required increased output, which will be processed more efficiently by the new units.

Key features of 7CDU include desalters and a two-drum overhead system which removes corrosive elements from the raw crude and enhances the reliability of the unit and allows processing of a heavier feedstock as needed. The 7CDU heater is energy efficient and has a duty of 445 MM Btu/hour and 36 low NOx burners. An additional key feature of 7VDU is the deep vacuum mode that helps the unit in maximising product yields. The units help transform crude oil into valuable petroleum products like LPG, Naphtha, Kerosene and Diesel, and also in preparing the remaining heavy oil fraction for further processing in the secondary conversion units (2-Hydrocracking Unit and 1-Resid Hydrocracking Unit).

SECOND HYDROCRACKER (2HCU)

BMP's No. 2 VGO Hydrocracking Unit (2HCU) is one of the most important conversion units in the refinery beside 1HCU and 1RHCU. Its configuration is similar to the existing Hydrocracking Unit (1HCU), with more complexity primarily due to a more intensive waste heat recovery scheme, aiming at maximising the unit energy efficiency. Both hydrocrackers utilise technology listened by Chevron Lummus Global (CLG). The unit also contains three make-up Hydrogen compressors which will also supply Hydrogen to several other process units in the refinery. The unit occupies a plot space of about twice as big as 1HCU (about 34,000 sq m – equivalent to about 5 football pitches).

The unit is a single train with two stages of reaction, having a capacity of 58,000 barrels of Vacuum Gasoil per day. The unit will receive raw feed from new/existing crude distillation units and 1RHCU. 2HCU will convert 99 percent of the low value feed into higher margin final products, mainly middle distillates (kerosene and diesel). The remaining 1 percent of unconverted oil will be blended into fuel oil. 2HCU will work together with 1RHCU in producing high quality products, starting from the "bottom of the barrel". This unit, along with 1RHCU, are the main contributors to the refinery profitability increase.

The unit has the heaviest equipment (reactors) and tallest column (fractionator) in the refinery. The transportation and erection of these equipment was a huge challenge and required extraordinary logistics efforts.

#3 SULPHUR PLANT

The #3 Sulphur Plant is a sulphur recovery, amine and sour water treating facility built as part of the BMP, and comprises 11 separate integrated process units.

The plant's main purpose is to recover H2S from the BMP Units' process streams and convert it into liquid sulphur. The liquid sulphur is then converted into solid pastilles in a separate unit, with the final product exported to other countries. Parsons is the technology licensor for the sulphur recovery and tail gas treating plants.

This plant includes several units, such as three Sulphur Recovery Units (SRUs), two Tail Gas Treating Units (TGTUs), two Bulk Acid Gas Removal Units (BAGRUs), two Amine Regeneration Units (ARUs) and two Sour Water Stripping Units (SWSs). The new SRUs will add 750 MT/Day capacity, leading to post-BMP refinery total sulphur production installed capacity of 1,535 MT/Day.

The new block is strategically located adjacent to the existing LSDP (Low Sulphur Diesel Production) Complex SRUs (towards its South-side), and at half a kilometre length is one of the longest blocks at the BMP site.

ENVIRONMENTAL COMMITMENTS

Environmental considerations have been central to the BMP, with more than 50 environmental and social studies conducted to ensure compliance with local regulations and international standards. The project will achieve a 50 percent reduction in sulphur dioxide emissions, a 5 percent reduction in nitrogen oxide emissions, and a 9 percent reduction in treated wastewater discharge.

Bahrain: balancing legacy & sustainability

Continued from page 2

and industrial sectors.

These technologies will play a crucial role in mitigating emissions from Bahrain's traditional hydrocarbons operations, further advancing the country's decarbonisation goals.

A SUSTAINABLE VISION FOR THE FUTURE

Bahrain's climate ambitions were prominently highlighted at COP29, where Dr Mohammed bin Mubarak bin Dainah, Minister of Oil and Environment, reaffirmed the Kingdom's dedication to combating climate change.

Despite contributing less than 0.1 per cent of global greenhouse gas emissions, Bahrain is implementing significant measures to reduce its carbon footprint. National initiatives include afforestation, mangrove restoration, and investments in environmental infrastructure to enhance climate resilience.

The government's efforts to quadruple the number of mangrove trees and expand green spaces reflect a nature-based approach to tackling climate change.

These initiatives, alongside plans to adopt advanced carbon removal technologies, highlight Bahrain's integrated approach to sustainability.

Dr Bin Dainah emphasised that such efforts align with the National Energy Strategy and support the Kingdom's transition to a more sustainable economy.

Strategic partnerships have further bolstered Bahrain's position as a leader in the energy transition. Bapco Energies' recent sale of a minority stake in the Saudi-Bahrain Pipeline Company to BlackRock is a notable example. The proceeds from this transaction are being used to fund infrastructure upgrades and decarbonisation projects, demonstrating Bahrain's openness to international collaboration.

Bapco Energies has also secured $500 million in funding from the US Export-Import Bank to expand operations in its oil and gas programme. This funding will support onshore oil and gas development while adhering to stringent environmental and social standards, balancing traditional energy development with sustainability objectives.

CONCLUSION

Bahrain's energy sector is at a critical juncture, balancing its historical reliance on hydrocarbons with a forward-looking vision for sustainability and innovation.

The Kingdom's comprehensive approach–modernising its oil infrastructure, investing in renewable energy, and adopting advanced technologies–sets a benchmark for resilience and adaptability in the region.

Aligned with :

رؤية VISION 2030

المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

SAUDI MADE

SINSINA HOLDING

PARTNER IN OIL & GAS SOLUTIONS

SKIDS

PROCESS AND MODULAR

- Gas Modular Skids
- Oil Modular Skids
- Water Injection Skids
- Chemical Injection Skids
- Lube Oil Skids
- Surge Relief Skids
- Dehydration Skids

GET IN TOUCH

SINSINA | MIS ARABIA | ROCLAD | SINSINA

Saudi Arabia
Jubail

Making strategic shift to renewables, diversification

Bahrain and fellow GCC nations are embracing renewable energy, hydrogen, and technological innovation to transition beyond oil reliance by 2050, Pablo Avogadri, Partner and Director, Energy, at BCG, tells ***OGN***

By ABDULAZIZ KHATTAK

BAHRAIN finds itself at a pivotal crossroads in the region's ongoing transition to a more sustainable energy future.

Historically dependent on oil and gas revenues, the Kingdom, like its GCC neighbours, faces both the challenge and opportunity to diversify its economy while maintaining its crucial role in the global energy landscape.

Overall, the GCC as a whole is making bold strides to align with global energy transition trends, focusing on expanding renewable energy sources and pioneering new technologies.

With abundant solar potential and strategic investments in large-scale projects, countries like Saudi Arabia, the UAE, and Oman are positioning themselves to lead in the clean energy space, Pablo Avogadri, Partner and Director, Energy, at BCG, told ***OGN*** energy magazine.

Below are excerpts from the interview:

Given the region's historic reliance on fossil fuels for economic and energy stability, what transformative changes or strategies do you foresee emerging in the Arabian Gulf to align with global energy transition trends, and how might these redefine the region's role in the global energy landscape?

The Gulf region, historically reliant on fossil fuels for economic and energy stability, is undergoing a significant transformation to align with global energy transition trends.

Several transformative changes and strategies are emerging, likely to redefine the region's role in the global energy landscape.

The Gulf countries are significantly increasing their investments in renewable energy, particularly solar and wind power, as part of a broader strategy to diversify their energy mix.

In solar energy, they have set an ambitious target of installing over 90 GW of capacity by 2030, reflecting a more than 100 per cent year-on-year growth compared to 2023.

In the wind energy sector, despite the challenges posed by low-speed winds and low capacity rates, Gulf nations are exploring the offshore wind potential.

They plan to install over 20 GW of wind capacity by 2030. Additionally, there are significant investments in smart grid technologies designed to integrate renewable energy into the grid more efficiently.

Artificial intelligence (AI) and the Internet of Things (IoT) are also being utilised to optimise energy consumption in cities and industries.

Efforts to connect energy grids across the GCC region are ongoing, fostering greater stability and efficiency.

Moreover, the Gulf countries are looking to become key players in the global energy market by exporting clean energy, including hydrogen and other renewable energy sources.

Hydrogen is emerging as a central element in their energy strategies. Large-scale green hydrogen projects are being developed in Saudi Arabia, Oman, and the UAE, leveraging their abundant and affordable renewable energy resources for electrolysis.

Collectively, the GCC countries are expected to account for 10-15 per cent of the global supply of green hydrogen by 2040.

At the same time, Gulf nations are producing blue hydrogen using their existing natural gas reserves and carbon capture technologies.

With their strong position in clean hydrogen, the GCC countries are also positioning themselves as major players in the emerging e-fuels market, aligning their ambitions with national visions such as Saudi Arabia's Vision 2030 and the UAE's Energy Strategy 2050.

Pablo Avogadri

Reducing dependence on oil revenue remains a key focus for Gulf countries as they work to diversify their economies.

Economic vision plans, such as Saudi Vision 2030 and UAE Vision 2050, prioritise the expansion into sectors like technology, tourism, and manufacturing, aiming to create more sustainable sources of income.

To support these efforts, Gulf states are making use of their substantial sovereign wealth funds, deploying them globally to invest in clean energy startups, research, and innovation.

Alongside these financial strategies, regulatory frameworks are being reformed to attract foreign direct investment in renewables and green technologies, creating a more favourable environment for such investments.

Furthermore, collaboration with international companies is helping to accelerate technology transfer and the execution of large-scale projects, furthering the region's economic diversification and development goals.

How should GCC nations balance their net-zero ambitions with their heavy dependence on fossil fuel revenues?

Balancing net-zero ambitions with a continued reliance on fossil fuel revenues requires a carefully structured strategy that ensures both economic stability and a smooth transition to sustainable energy.

Gulf nations must adopt an approach that capitalises on their existing strengths in the energy sector while diversifying their economies to ensure long-term resilience.

One key strategy involves decarbonising the fossil fuel value chain through advancements in carbon capture, utilisation, and storage (CCUS), alongside eliminating methane emissions.

CCUS enables Gulf countries to monetise their hydrocarbon resources more sustainably, contributing to global decarbonisation efforts while continuing to benefit from their fossil fuel reserves.

The region's abundant solar resources also present an opportunity for global export of renewable energy.

Large-scale projects aimed at producing and exporting green hydrogen and clean electricity offer new revenue streams, in line with the global shift in energy demand and increasingly stringent regulations.

Additionally, accelerating economic diversification is crucial. Investments in non-oil sectors such as real estate, tourism, logistics, manufacturing, and technology should be prioritised.

At the same time, sovereign wealth funds can be deployed strategically to invest in global green energy initiatives and emerging industries, securing steady income streams even as oil and gas revenues gradually decline.

Finally, fostering regional collaboration and global partnerships will allow GCC nations to pool resources, share expertise, and create unified policies that drive efficiency across energy and economic sectors.

What economic diversification strategies do you recommend for smaller, oil-dependent economies like Bahrain to transition effectively?

For a smaller, oil-dependent economy like Bahrain, economic diversification presents both a challenge and an opportunity.

To transition effectively, Bahrain should adopt a multi-faceted approach, capitalising on its existing strengths while developing new high-growth sectors.

One key area for diversification is the energy mix. While Bahrain currently relies heavily on gas for power generation, there is significant potential to invest in low-carbon generation technologies, even within the constraints of limited available land.

By exploring innovative technologies that require smaller spaces, both onshore and offshore, and focusing on small-scale and distributed generation, Bahrain can gradually reduce its reliance on fossil fuels.

To transition effectively, Bahrain should adopt a multi-faceted approach, capitalising on its existing strengths while developing new high-growth sectors.

Strengthening energy security is another crucial aspect of Bahrain's transition. Developing interconnections with neighbouring countries and expanding fuel logistics would increase the country's flexibility and reduce its dependence on limited or unreliable resources.

Furthermore, Bahrain must rebalance its use of energy by reducing exposure to sectors that rely heavily on affordable energy.

Diversifying revenue streams in sectors like financial and digital services, logistics and trade, and tourism and culture can help build a more resilient economy.

By leveraging these existing strengths, Bahrain can create a more sustainable and diverse economic foundation for the future.

What are the most promising zero-carbon solutions or technologies that GCC countries should adopt to maintain energy leadership?

Carbon capture, utilisation and storage (CCUS) plays a crucial role in decarbonising industrial processes and existing oil and gas operations.

GCC nations can leverage their expertise in large-scale projects to implement CCUS in sectors such as power generation, refining, and petrochemical facilities.

This would allow the continued use of fossil fuels in a more sustainable manner, aligning with global decarbonisation goals.

Expanding renewable energy is also a critical priority, with scaling up solar and wind power being essential for meeting domestic energy needs while reducing emissions.

Additionally, the GCC can explore the export of surplus renewable energy or utilise it for green hydrogen production, further positioning the region as a leader in clean energy.

Energy efficiency technologies offer a low-cost and impactful solution to reducing energy consumption and emissions across industrial and residential sectors.

Implementing smart grid systems, energy-efficient building codes, and advanced cooling systems can significantly improve efficiency, leading to both cost savings and environmental benefits.

Moreover, to stabilise the supply of renewable energy, investments in battery storage and modernising grid infrastructure are essential.

These technologies will allow the GCC to integrate intermittent renewable energy sources effectively, ensuring a reliable and consistent power supply for the region.

How can artificial intelligence (AI) enhance the profitability and efficiency of energy companies during the transition to cleaner energy sources?

Optimising exploration and production is one area where AI has a significant impact, enhancing seismic interpretation and reservoir modelling, predicting reservoir performance, and identifying optimal drilling plans to maximise throughput.

In midstream and downstream, AI helps improve returns by monitoring equipment in real-time, enhancing yields to maximise gross margins, and predicting failures to schedule maintenance, which reduces downtime, extends asset lifespan, and lowers costs.

AI also plays a vital role in the integration of renewable energy, optimising power generation by forecasting output, balancing supply and demand, ensuring grid stability, and reducing waste.

In supply chain management, AI streamlines operations by optimising logistics, inventory management, and procurement processes, leading to greater efficiency across the value chain.

Is carbon capture and storage (CCS) a viable solution for GCC economies, and what role can it play in meeting global climate goals?

CCS is a crucial solution for GCC economies, enabling them to balance economic sustainability with global climate goals.

The region's existing expertise in energy infrastructure, coupled with abundant geological storage capacity, uniquely positions it to lead in CCS implementation.

CCS can play a pivotal role in decarbonising oil and gas operations, supporting the production of blue hydrogen, and creating opportunities for carbon import, use, and storage.

What specific renewable energy strategies, such as solar or hydrogen, hold the most promise for the region's unique geography and climate?

The GCC's geography and climate make it well-suited for solar, hydrogen, and wind energy development.

In solar power, the region's world-class solar irradiance and vast, affordable land are key assets, allowing for large-scale projects that generate clean energy for domestic use while displacing fossil fuels and increasing export potential.

In hydrogen production, the GCC is well-positioned as a global leader, with green hydrogen powered by renewables and blue hydrogen supported by natural gas and CCS.

Projects like Saudi Arabia's NEOM and Oman's Hydrom are paving the way for this transition.

Additionally, the region's high wind power density, particularly in areas like Oman and Saudi Arabia, supports wind energy projects such as the Dhofar Wind Farm, diversifying renewable capacity.

Small-scale and distributed generation can help Bahrain reduce its reliance on fossil fuels

What policy shifts or incentives are necessary to encourage private sector participation in the clean energy transition?

Renewable energy policy should focus on setting reliable, comprehensive, and transparent regulations to provide investment certainty.

Financial support can be enhanced by offering affordable access to capital, tax breaks, or carbon pricing where needed to create attractive investment opportunities.

Public-private partnerships (PPPs) can help share risks and attract investment in large-scale renewable projects.

Simplifying permitting processes through a streamlined regulatory framework will reduce the risk of delays and encourage further investments. Additionally, feed-in tariffs and net metering should be implemented to allow private entities to sell renewable energy back to the grid profitably, ensuring fair access and potentially unbundling the grid.

How can fossil fuel companies in the GCC leverage investments in research and development to remain competitive?

GCC fossil fuel companies can stay competitive by investing in R&D to innovate and align with energy transition trends.

Key areas of focus include enhanced recovery methods to improve hydrocarbon reservoir efficiency, as well as emission reduction strategies to decarbonise the production and use of hydrocarbons, making them part of the solution to future energy challenges.

Advancing hydrogen and e-fuels will capture the growing market, while integrating renewables and low-carbon technologies helps diversify energy portfolios.

Additionally, digital transformation through AI and analytics can optimise operations and reduce costs, further enhancing competitiveness in the evolving energy landscape.

What role, if any, do you see for oil and gas in the region's energy mix by 2050, and how should companies in the GCC position themselves for this evolving reality?

Oil and gas will remain integral to the region's energy mix by 2050, though with a reduced share as alternative energy sources expand.

GCC energy companies can adapt to shifting demand and rising competition by enhancing cost efficiency through digitalisation and automation, which help cut costs and boost profitability. Decarbonising operations by focusing on cost-competitive solutions is also crucial in meeting future energy demands.

Additionally, diversifying markets and products by targeting growing markets in Asia and Africa, and investing in renewables, hydrogen, and carbon capture, will enable companies to meet the increasing demand for low-carbon solutions.