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Oil Gas & Power

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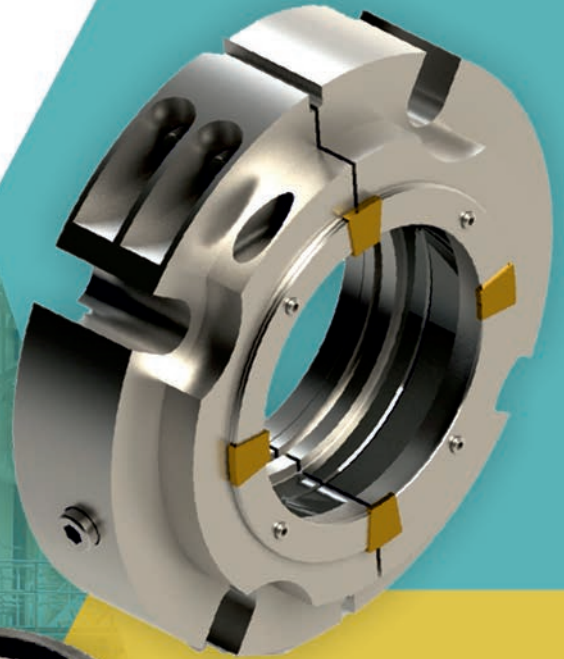
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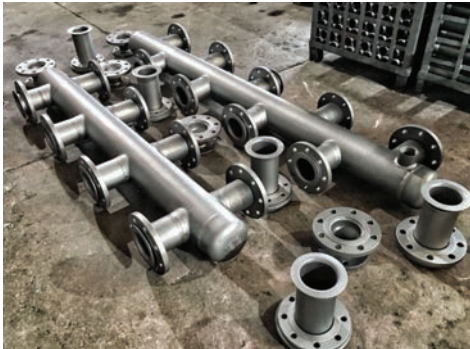
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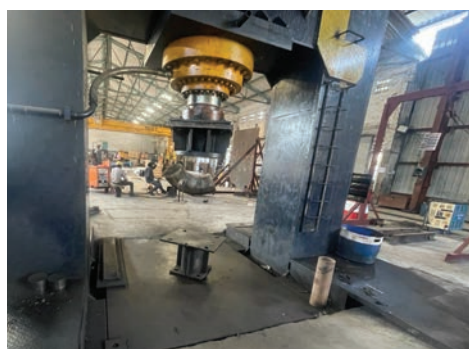
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PM addresses G20 Energy Ministers' Meet



New Delhi, India: The Prime Minister underlined that even though every nation has a different reality and pathway for energy transition, he firmly believes that the goals of every country are the same. Throwing light on India's efforts in green growth and energy transition, he pointed out that India is the most populated nation and the fastest-growing large economy in the world and yet is strongly moving towards its climate commitments.

The Prime Minister informed that India has achieved its non-fossil installed electric capacity target nine years in advance and set a higher target for itself. He mentioned that the nation plans to achieve 50% non-fossil installed capacity by 2030. "India is also among the global leaders in solar and wind power", the Prime Minister said as he expressed delight that the Working Group delegates got a chance to witness the level and scale of India's commitment to clean energy by visiting the Pavagada Solar Park and Modhera Solar Village. He also touched

upon starting the largest agricultural pump solarization initiative in the world and India's domestic electric vehicle market projection of 10 million annual sales by 2030.

He also highlighted commencing the rollout of 20 percent Ethanol Blended Petrol this year which aims to cover the entire country by 2025. For decarbonizing India, the Prime Minister said that the country is working on Mission mode on Green Hydrogen as an alternative and aims to transform India into a Global Hub for the production, use and export of Green Hydrogen and its derivatives.

India-UAE Joint Statement on Climate Change



New Delhi, India: Narendra Modi, Prime Minister of India, and His Highness Sheikh Mohamed bin Zayed Al Nahyan, President of the United Arab Emirates (UAE) recognized the urgent need to address the global challenge of climate change through global collective action while respecting

Koppu Sadashiv Murthy set to be next CMD of BHEL



Koppu Sadashiv Murthy is set to be the next Chairman & Managing Director (CMD) of Bharat Heavy Electricals Limited (BHEL). The Public Enterprises Selection Board (PESB) panel has recommended the name of Murthy for the BHEL's CMD post.

The CMD post in BHEL will fall vacant on November 1st, 2023. Dr. Nalin Shinghal is the current CMD of BHEL.

Murthy has been recommended for the post of CMD of BHEL from a list of two candidates who were interviewed by the PESB panel in its selection meeting held on June 30. Another candidate on list was also from BHEL.

the foundational principles and obligations under the United Nations Framework Convention on the Climate Change (UNFCCC) and the Paris Agreement. The leaders committed to enhance cooperation on climate ambition, decarbonization, and clean energy, and work together to have tangible and meaningful outcomes from the 28th Session of the UNFCCC Conference of Parties.

Prime Minister Narendra Modi congratulated the UAE as the selected host country of COP28 in 2023 and extends his full support to the UAE's COP28 Incoming Presidency. His Highness President Sheikh Mohamed bin Zayed Al Nahyan, in turn, congratulated India for its leadership role in the G20.

Both leaders underscore the imperative of achieving ambitious, balanced, and implementation-oriented outcomes at COP28 across all the important pillars of global climate action; namely the mitigation, adaptation, loss and damage and means of implementation including climate finance. The leaders call upon all Parties to engage constructively and demonstrate solidarity in the pursuit of these outcomes.

Chemicals & Petrochemicals demand in India expected to nearly triple and reach USD 1 trillion by 2040

New Delhi, India: "25% of the global energy demand growth in the next two decades is going to emanate out of India", said the Union Minister of Petroleum & Natural Gas and Housing & Urban Affairs Hardeep Singh Puri.



Hardeep Singh Puri, Union Minister of Petroleum & Natural Gas and Housing & Urban Affairs

Talking on energy availability, affordability and security for all, the Petroleum Minister said, "The market size of the Indian Chemicals and Petrochemicals sector is currently USD 190 Billion. This sector supports the Hon'ble Prime Minister's initiative of Make in India and Make for the World, as it can transform India into a global manufacturing hub". "India is not only the sixth largest chemicals producer in the World and the fourth in Asia but also exports Chemicals to more than 175 countries. It accounts for 13% of India's total exports", added Puri.

Talking about the growth of Petrochemical Sector in India, the Petroleum Minister said that it is governed by several factors, the most important of these is the increasing demand for petrochemical products from a growing population and a rapidly expanding economy. "The India petrochemical industry has come a long way from inception in the 1970s and is poised for transformational growth. It is expected to contribute almost 10% to the incremental growth in the global petrochemical demand in the coming years", added Hardeep Singh Puri.

PM Prasad takes charge as Chairman & Managing Director of Coal India



PM Prasad has assumed charge as the new Chairman-cum-Managing Director (CMD) of Coal India Limited (CIL) on Saturday. Prior to this, he was serving as Chairman-cum-Managing Director (CMD) of Central Coalfields Limited (CCL) since October 1, 2020.

He has over 38 years of experience in the varied facets of operations and management. In 1994-95, he was instrumental in reopening of DRC mines which was affected by the underground fire during his posting in WCL. He was awarded as 'Best Mines Manager' from Secretary Coal, Ministry of Coal (MoC) and Chairman, Coal India Limited in 1995.

Coal Ministry Invites Proposals for Research & Development in Coal Sector

New Delhi, India: The Ministry of Coal invites research proposals from Academic Institutions and Research Organizations. Thrust Areas for Research & Development in coal sector includes the following: Advanced technology/methodology for improvement of production & productivity from underground mining and open cast Mining; Improvement of safety, health and environment; Waste to wealth; Alternative use of coal and clean coal technologies; Coal beneficiation and utilization; Exploration and Innovation and indigenization (Under Make-in-India concept).

The guidelines, format and online submission facility available at the website: <https://scienceandtech.cmpdi.co.in> and the last date of submission of proposal is 15th July 2023.

“India is a world leader in energy transition, we will adhere to our pledge of making 50% of energy from non-fossil fuels by 2030”

New Delhi, India: The Union Minister for Power and New and Renewable Energy R. K. Singh has reiterated the need for India to keep adding energy capacity so that the nation can keep growing in the times to come. “What we need to be concerned about is the requirement of energy for our growth. There can be no compromise on this. Our electricity demand is growing rapidly. By 2030, energy



R K Singh Minister for Power and New and Renewable Energy

consumption is expected to double. We will need to add capacity so that our country can grow.

Net Zero is important, but what is more important is that we ensure enough electricity for our growth. The living standards of our people will need to improve - and that will require higher per capita consumption of electricity”. The Power Minister recalled that the country has added 1.84 lakh MW of power from 2014 till now, but that this is not sufficient. Our per capita carbon emissions are one third of global average, and there is going to be no compromise in ensuring 24/7 electricity, said the Minister.

Sanjay Varma takes over as Managing Director of Mangalore Refinery Pvt Ltd



Sanjay Varma, who is serving as Director (Refinery) of MRPL, has taken over additional charge as Managing Director of Mangalore Refinery and Petrochemicals Limited (MRPL).

Varma has rich exposure & expertise the oil and gas industry. During his three-and-a-half decades of service, he headed the organisation in operations management, project management, materials management and HSE management.

MNRE holds Review Meeting with States & UTs on Progress of Renewable Energy



Bhagwanth Khuba, Union Minister of State for New & Renewable Energy, Chemicals and Fertilizers

New Delhi, India: Union Minister of State for New & Renewable Energy, Chemicals and Fertilizers, Bhagwanth Khuba chaired the review meeting with States/UTs on progress of Renewable Energy Schemes and Capacities in New Delhi today.

B. S. Bhalla, Secretary, MNRE and Alok Kumar, Secretary, Ministry of Power were also present on the occasion. Principal Secretaries (Energy) /Secretaries of Power & New & Renewable Energy from States/UTs besides senior officials from CEA, Power Grid Cooperation, Power Finance Cooperation, Rural Electrification Corporation, CTU, Grid Controller of India, Ministry of Power and MNRE attended the meeting.

Speaking on the occasion, Hon'ble Minister of State for New and Renewable Energy, Bhagwant Khuba highlighted that the energy sector plays a major role in deciding

the future of India. The Ministry of Power & Ministry of New & Renewable Energy are working in unison on a number of initiatives, including increasing the domestic manufacturing of Solar PV Modules and increasing the transmission capacity. He also stressed that our actions should be to protect our environment & natural resources for our future generations. Further, Hon'ble Minister of State emphasized on the vision laid by our Hon'ble Prime Minister of India Narendra Modi through the Panchamrit 5 nectar principles.

India's G20 Presidency is an opportunity for offshore wind for clean energy transition ambitions

Mumbai, India: As part of the third Energy Transition Working Group (ETWG) meeting under India's G20 Presidency, the Ministry of New and Renewable Energy (MNRE), Government of India, in collaboration with the Global Wind Energy Council (GWEC) and National Institute of Wind Energy (NIWE) convened a high-level event "Harnessing Offshore Wind for Accelerating Energy Transition: The Way Forward" on 16th May 2023 in Mumbai.

Bhupinder Singh Bhalla, Secretary, Ministry of New and Renewable Energy (MNRE), Government of India, attributed offshore wind as a solution to air pollution and climate change mitigation. He emphasized the jobs creations opportunity through the flourishing of the offshore wind value chain. He outlined India's strides in harnessing offshore wind given its role in balancing the grid.

S Sundaram set to be next Director (Projects) of NTPC Ltd



Shanmugha Sundaram is set to be next Director (Projects) of NTPC Limited, a Maharatna PSU under the Ministry of Power. He has been recommended for the post by the Public Enterprises Selection Board (PESB) panel. Presently, he is serving as Head of Project at NTPC Kaniha, Odisha.

The Director's (Projects) post in NTPC will fall vacant on December 1. Currently, U K Bhattacharya is serving as Director (Projects) of NTPC.

S Sundaram is a veteran power professional and has over 34 years of experience in the power sector. He joined NTPC in 1988 and started his career as an Executive Trainee from Badarpur. Prior to joining NTPC Kaniha, Sundaram was posted as the Head of the Project at Baruni Thermal Power Station, Bihar.

He further added that India's G20 Presidency is an opportunity for offshore wind countries, businesses, and financial institutions to work together and build on mutual strengths to support national, regional, and global offshore wind and clean energy transition ambitions.

Reliance and bp commence production from third deepwater field in India's KG D6 block



Mukesh Ambani, Chairman & Managing Director, Reliance Industries Limited

Mumbai, India: Reliance Industries Limited (RIL) and bp p.l.c. today confirmed the commencement of production from the MJ field, following testing and commissioning activities. The MJ field represents the last of three major

new deepwater developments the RIL-bp consortium have brought into production in block KG D6 off the east coast of India.

The start of gas & condensate production from the MJ field follows the start-up of the R-Cluster field in December 2020 and Satellite Cluster in April 2021. All three developments utilise the existing hub infrastructure for the block.

Together, the three fields are expected to produce around 30 million standard cubic metres of gas a day (1 billion cubic feet a day) when MJ field reaches peak production. This is expected to account for around one third of India's current domestic gas production and meet approximately 15% of India's demand.

Mukesh Ambani, Chairman and Managing Director of Reliance Industries Limited, said: "We continue to be proud of our partnership with bp that combines our expertise in commissioning complex projects under some of the most challenging environments in the last few years. Alongside the other KG D6 fields, the MJ development truly supports the 'Make in India' and 'Energy vision' laid out by the Government of India."

bp Chief Executive Bernard Looney added: "By safely bringing these new developments onstream, RIL and bp are making an important contribution to meeting India's demand for secure supplies of gas. Our close strategic partnership with RIL now stretches back over 15 years and we are proud of how it continues to deepen – in gas, retail, aviation fuels and sustainable mobility solutions. Together we are helping to meet India's growing energy needs, bringing the best of each partner to create real value."

Rajiv Kumar Porwal takes charge as Director (System Operation) of Grid India



Rajiv Kumar Porwal has assumed charge as Director (System Operation) of Grid Controller of India Limited (Grid-India). Prior to this, he was contributing as Executive Director, NRLDC, Grid-India.

Porwal will be responsible for the overall secure and reliable operation of the India's Power System, operational planning, grid integration, scheduling and dispatch of electricity, monitoring real-time electricity grid operations, post facto analysis of the grid operations through the NLDC & RLDCs as well as cyber security.

MNRE announces major reforms for Solar Photovoltaic Modules

New Delhi, India: The Ministry of New & Renewable Energy (MNRE) has come up with a number of reforms in its ALMM mechanism for Solar Photovoltaic Modules. The reforms are primarily aimed at reducing cost to solar PV manufactures, time between application to enlistment as well as compliance burden and increasing ease of doing business in the whole ALMM process.

The major reforms include Reduction in application fee by 80%; Substantial reduction in inspection fee, with reduction in certain cases being as high as 70%; Exemption from factory inspection in case of enlistment of additional models in ALMM which are similar to those already enlisted by the applicant but having lower wattage; Allowing the manufacturers to withdraw their applications prior to factory inspection, with refund of 90% of application fee; Increase in ALMM enlistment validity from 2 years to 4 years; Grant of provisional enlistment in ALMM within 7 days of receipt of BIS registration and time-limit of two months for factory enlistment and final enlistment, failing which deemed enlistment; All future ALMM application to be accompanied by scanned copy of applications and processing of ALMM applications will start without waiting for the submission of hard copies, which can be submitted subsequently; Introduction of following end-use category-wise minimum module efficiency thresholds for enlistment in ALMM: a. Utility/ Grid Scale Power Plants: 20.00%, b. Rooftop and Solar Pumping: 19.50%, c. Solar Lighting: 19.00%

India successfully navigated the energy trilemma of energy availability, affordability and sustainability

New Delhi, India: Hardeep S Puri, Union Minister of Petroleum & Natural Gas, and Housing & Urban Affairs, stated that India has successfully been able to modulate the effective price to consumer, thus insulating the common man from price rise and volatility in international prices. He said that while nations in our neighbourhood and perhaps even developed countries might have struggled with energy rationing, pump dry-outs and spiralling fuel prices, among other concerns, India's policy successfully ensured a sustained availability of fuel. This has led to the lowest price inflation in the world.

The Minister highlighted that there was a need to ensure stable, secure and affordable energy supplies as India continues on its fast trajectory of growth towards a USD 5 trillion economy and then to a USD 10 trillion economy. He stated that reforms in the energy sector in general, and the oil and gas sector in particular, demonstrate India's commitment to energy security, ease of doing business, and energy transition.

Recently, in a major policy reform which gave fresh impetus to the gas sector, the Cabinet approved a series of critical gas pricing reforms. In the absence of these decisions, he stated that gas prices would have been uncompetitive to alternative fuels and hindered the expansion of the gas-based economy. The prices of gas for priority consumers would have increased by about 10% in the next half-year and continued to rise in the subsequent periods, the Minister further said.

Bani Verma set to be Director (Industrial Systems & Products) of BHEL



Bani Verma is set to be next Director (Industrial Systems & Products) of Bharat Heavy Electricals Limited (BHEL). She has been recommended for the post by the Public Enterprises Selection Board (PESB) panel. Presently, she is serving as Executive Director in the same Maharatna PSU.

Verma will be a member of the Board of Directors and will report to the Chairman and Managing Director (CMD). She will act as the Business Sector Chief and be responsible for marketing management of systems and products pertaining to industry sector covering captive power, transmission, rail transportation, defence, industrial products and renewable energy segments.

Now, the Administered Price Mechanism (APM) prices will be determined monthly at 10% of the average Indian Crude Basket Prices, with a ceiling (USD 6.5/MMBTU) and floor (USD 4/MMBTU). The ceiling will remain the same for the first two years and then increase by USD 0.25/MMBTU every year, to adjust for any cost inflation.

Bharat Heavy Electricals Limited (BHEL) signs a Technical Assistance and License Agreement with General Electric Technology GmbH Switzerland for Gas Turbines

New Delhi, India: BHEL has been manufacturing and supplying GE-design Gas Turbines to various customers in India and abroad since 1986. Under this extension Agreement, BHEL will gain enhanced rights for existing / updated and new Gas Turbine models.

BHEL, in partnership with GE, is the market leader for Gas Turbines in India. As on date, BHEL has supplied about 230 GE-design Gas Turbines to various oil refineries, process industries and utilities in India and to various overseas customers. In addition, for the last 25 years, BHEL GE Gas Turbine Services (BGGTS) - a 50: 50 JV between BHEL and GE, is providing aftermarket support for engineering, repair, and maintenance services to various customers.

India's focus on achieving net zero emissions and including green hydrogen in the energy mix will also require future-ready power technologies. As per the

agreement, BHEL will also be able to supply Gas Turbines with fuel blends viz. Hydrogen, Methanol, Syngas, etc. and in hybrid configuration contributing towards accelerating the energy transition in India; and through Aero-derivative Gas Turbines helping in grid balancing vis-à-vis the nation's ambitious renewable energy build-up target.

Shell to invest USD 10-15 billion by 2025 to develop low-carbon energy solutions

London, United Kingdom: Shell is making good progress towards its target to become a net-zero emissions energy business by 2050, by reducing emissions from its operations, and from the fuels and other energy products it sells to customers. Shell will continue to make progress by aiming to achieve near-zero methane emissions by 2030 and to eliminate routine flaring from its upstream operations by 2025, moving faster than the World Bank's Zero Routine Flaring 2030 initiative.

"We are investing to provide the secure energy customers need today and for a long time to come, while transforming Shell to win in a low-carbon future. Performance, discipline, and simplification will be our guiding principles as we allocate capital to enhance shareholder distributions, while enabling the energy transition," said Shell Chief Executive Officer, Wael Sawan.

Sandeep Zanzaria Appointed Managing Director of GE T&D India Ltd



GE announced the appointment of **Sandeep Zanzaria** as Managing Director and Chief Executive Officer of GE T&D India Limited effective April 17, 2023. He succeeds Pitamber Shivnani, who retired from the post of Managing Director and CEO on December 31, 2022.

Sandeep brings with him more than three decades of experience in the power sector. He joined GE in 2017 as the regional commercial leader for GE Grid Solutions, South Asia, and was responsible for commercial strategy and order intake for the region. Sandeep began his career at BHEL in 1990 and spent over 14 years in a range of roles that involved increasing responsibilities in commissioning, project management, and engineering. Later, he took up various roles at Areva T&D, Alstom T&D and Schneider Electric. Prior to joining GE in 2017, he was Vice President (head of Project Business) for Schneider Electric in South Asia.

Thyssenkrupp and Johnson Matthey increase ammonia synthesis capacity at Koch Fertilizer facility

Iowa, United States: Working in collaboration, thyssenkrupp Uhde and Johnson Matthey have delivered a product solution to increase the ammonia capacity at Koch Fertilizer's Fort Dodge, Iowa (USA) facility. During the revamp of the existing ammonia plant, the team integrated the Uhde dual-pressure process, which was installed upstream of the existing ammonia synthesis loop. Koch Fertilizer, a leading fertilizer manufacturer and distributor, performed a \$140 million revamp at its Fort Dodge facility to further improve reliability, environmental and safety performance.

The investment is expected to increase ammonia production capacity by 85,000 tons per year. To help achieve the additional capacity, process experts from thyssenkrupp Uhde developed a new cartridge insert for the existing pressure shell based on latest design principles. Thanks to thorough scheduling, most of the installation work was done while the existing plant was running. Commissioning of the new Uhde® ammonia converter was smooth with Johnson Matthey on-site support and did not impact plant start-up time.

Air Liquide and ©Statkraft signs green PPA deal for its electrolyser plant in Germany

Oberhausen, Germany: Statkraft, Europe's largest producer of renewable energy, and Air Liquide, the global market leader in gases, technologies and services for

industry and healthcare, have concluded a wind PPA to produce green hydrogen. The renewable energy will power Air Liquide's new electrolyser plant in Oberhausen to produce renewable hydrogen at industrial scale for industry and transport applications.

The Norwegian state-owned company will supply Air Liquide with renewable power from its wind portfolio in Germany for three years starting in 2024. The French producer of technical gases will use the power to produce renewable hydrogen at large scale in its newly built 20 MW "Trailblazer" water-electrolysis plant in Oberhausen, Germany. This PPA will allow Air Liquide to certify the hydrogen as renewable and to achieve full REDII-compliance, so their customers will be able to market products with a lower-carbon footprint.

The electrolyser will be integrated into the existing infrastructure of Air Liquide in the Rhine-Ruhr-valley to supply key industries and the transport sector with renewable hydrogen and oxygen.

Asahi Kasei and Mitsui to establish procurement systems for bio-methanol

Tokyo, Japan: Asahi Kasei Corporation and Mitsui will establish a supply and procurement scheme for bio-methanol produced in the United States. Through this scheme, Asahi Kasei plans to use the bio-methanol procured from Mitsui to produce in Japan engineering plastics with a lower carbon footprint than existing products. Today, companies in Japan are increasingly

Linde CEO Sanjiv Lamba named Co-Chair of Hydrogen Council



Linde CEO Sanjiv Lamba has been named as incoming Co-Chair of the Hydrogen Council, an industry initiative that brings together leading companies with a united vision and long-term ambition for hydrogen to foster the clean energy transition. Linde is one of the founding members of the Hydrogen Council and has been a leader in the hydrogen business for more than 50 years.

"Hydrogen plays a critical role in the transition to a low-carbon economy and will require significant commitment to scale up across the entire value chain," said Lamba. "The Hydrogen Council, as a CEO-led organization, is uniquely positioned to provide leadership in this journey. I am delighted to be appointed as a Co-Chair and look forward to serving alongside other hydrogen leaders at this pivotal time for our world."

stepping up their efforts to reduce GHG emissions throughout their product supply chains, including raw material-derived greenhouse gases, known as Scope 3 emissions, in order to achieve carbon neutrality by 2050, as advocated by the Japanese government.

In this context, Asahi Kasei is working to reduce GHG emissions by manufacturing various engineering plastics, such as TENAC, a polyacetal (POM) resin, using biomass-based materials with low GHG emissions. Asahi Kasei and Mitsui are working together to find solutions to various issues related to material procurement. In the United States, Mitsui procures RNG (renewable natural gas) generated from municipal waste landfills in the form of biogas and uses it in the mass balance approach² to produce bio-methanol at Fairway Methanol, a local joint venture.

TotalEnergies inaugurates ACC's first gigafactory for battery production

Courbevoie, France: Automotive Cells Company (ACC) recently inaugurated its first gigafactory for electric vehicle batteries in Billy-Berclau/Douvain in the Hauts-de-France region. The first gigafactory, a flagship on a European scale, includes over 60,000 m² of workshops, with an initial production line featuring a capacity of more than 13 GWh, rising to 40 GWh by 2030. Ultimately, two other gigafactories will open their doors in Kaiserslautern (Germany) in 2025 and Termoli (Italy) in 2026, thereby enabling ACC to reach 120 GWh at full industrial capacity by 2030. ACC represents the culmination of the collaborative effort between TotalEnergies, Stellantis and Mercedes-Benz, and should accelerate Europe's transition towards a sustainable mobility accessible to all.

Founded in 2020, ACC is a joint venture between Stellantis, Mercedes-Benz and TotalEnergies, through its affiliate Saft, which is behind the technology used by ACC. ACC is positioned as a key player in the battery industry to equip high-performance, low-carbon electric vehicles that are accessible to the greatest number of people.

ONGC stands tall among Indian PSUs in Forbes' 'The Global 2000' List 2023

Mumbai, India: ONGC, India's Energy Maharatna, has achieved a significant milestone by securing the 226th rank in the prestigious Forbes' "The Global 2000" List for 2023. This recognition exemplifies ONGC's unwavering commitment to excellence and its remarkable growth as a major player across 58 countries.

ONGC takes immense pride in this exceptional achievement, standing as the sole Indian PSU positioned within the top 250 companies on this esteemed list. This notable accomplishment underscores company's consistent expansion, robust financial position, and unwavering dedication to excellence.

Forbes' "The Global 2000" List recognizes the world's largest companies based on key metrics such as sales, profits, assets, and market value. ONGC's inclusion in this prestigious ranking reaffirms its leading position in India's corporate sector and global recognition.

ONGC remains resolute in its pursuit of excellence, growth, and meeting India's energy needs.

thyssenkrupp awarded a contract for 60 KTPA Poly Butadiene Rubber Plant (PBR) by IOCL



Rajesh Kamath, CEO & Managing Director, thyssenkrupp Industrial Solutions

Mumbai, India: Indian Oil Corporation Limited (IOCL) has awarded an EPC contract to thyssenkrupp Industrial Solutions India Private Ltd. (tkIS India) of approximately more than USD 100 Million for 60 KTPA Poly Butadiene Rubber Plant (PBR) for their Panipat Refinery & Petrochemical Complex, Haryana in India.

Polybutadiene rubber, manufactured from the polymerization of butadiene finds its applications in the manufacture of tires and additives. thyssenkrupp Industrial Solutions India Private Ltd. with its experience

in implementing various refinery and petrochemical projects will execute this project on an LSTK basis based on technology from a reputed licensor. The lump-sum EPC scope includes residual process engineering, detail engineering, Project Management, Procurement, Construction, & Commissioning of the plant.

“thyssenkrupp Industrial Solutions (India) comes with a rich experience in the execution of petrochemical and refinery projects. We thank IOCL for their continued trust and support in our capabilities. This contract is proof of the engineering expertise we hold as an organization and we are motivated towards its successful completion”, said Rajesh Kamath, CEO & Managing Director of ThyssenKrupp’s chemical plant business (thyssenkrupp Industrial Solutions) in India.

In the past, tkIS India has executed multiple refineries and petrochemical projects for IOCL across its various refineries. At present, apart from the other contracts being executed on EPCM and PMC models, tkIS India is also implementing the n-Butanol project and Catalytic Dewaxing Project on EPC basis for IOCL’s Gujarat Refinery.

Clariant’s MegaMax® catalyst chosen by European Energy for world’s largest e-methanol plant

Munich, Germany: Clariant Catalysts continues to drive energy transition lighthouse projects. European Energy selected Clariant’s methanol synthesis catalyst MegaMax for the world’s largest e-methanol project. Located in Kasso, Denmark, the facility is scheduled to start operations by the end of 2023. It will have the capacity to produce 32,000 tons of e-methanol annually from carbon dioxide using Clariant’s catalyst. MegaMax was chosen as it is proven to deliver high activity and stability under the challenging conditions of CO₂-to-methanol conversion. A large portion of the plant’s annual yield is already allocated to the maritime giant Maersk for powering its first-ever carbon-neutral fleet. The remaining green methanol will be supplied to the Lego Group and Novo Nordisk

Georg Anfang, Vice President Syngas and Fuels at Clariant Catalysts, commented, “We are proud to be part of this pioneering project with European Energy. Clariant Catalysts has been developing Power-to-X technologies, including green methanol, for over a decade. As a

substitute for maritime bunker fuel, green methanol has a huge potential to be a key component of the energy transition to decarbonize the transport sector.”

European Energy was founded in 2004 with the goal of driving the green transition and developing sustainable, fossil-free energy solutions. The multinational company has major investments in solar and wind energy projects, as well as power-to-x and carbon capture technologies. European Energy builds 1000 MW of renewable energy annually.

Cairn Oil & Gas gross Reserves plus Resources exceeds 1.1 billion barrels of oil equivalent

New Delhi, India: Cairn Oil & Gas, India’s largest private oil and gas exploration and production Company, and a unit of Vedanta Group, has announced that its Reserves and Resources portfolio has crossed 1.1 Bboe.

The Company’s estimated total gross 2P Reserves plus 2C Resources stand at 1,156 MMboe, of which oil accounts for 85%. The gross hydrocarbons in place across all Cairn’s assets totals approximately 6.7 Bboe of which 1.18 Bboe has been produced to date¹. Cairn is defining up to 20 potential new development projects to bring a substantial proportion of the 846 MMboe of gross 2C Resources into production. During the fiscal year ending 31 March 2023, total Reserve plus Resource additions exceeded production, largely due to the award of eight Discovered Small Field (DSF) licenses. This addition resulted in a Resource Replacement Ratio of 108%.

Commenting on the business milestone, Nick Walker, CEO of Cairn Oil & Gas said, “Cairn has a world-class Resource base of over 1.1 Bboe gross, and we continued to sustain the business last year, adding more Resources than we produced. We have significant undeveloped Resources and we’re moving at pace to apply the latest technology to define a portfolio of up to 20 new projects. We’ve also a material exploration position in India and are commencing an exciting exploration drilling program aimed at continuing to grow our Resources. Cairn is committed to increasing India’s domestic oil and gas production, with a vision to contribute 50% of the country’s crude production. ■

Diversifying India's Natural Gas Infrastructure



Satinder Pal Singh

Chief Executive Officer

Adani Total Pvt. Ltd. & Dhamra LNG Private Limited

During March-May 2023, the Dhamra LNG Terminal and Jagdispur-Haldia-Borkaro-Dhamra Pipeline successfully completed construction, commissioned and started operations, a first in India's eastern region. This article provides a behind the scenes perspective to what went into delivering this project and examines the strategic relevance of this infrastructure to India becoming a gas driven economy.

Natural Gas is the cleanest burning fossil fuel. It is accordingly considered globally as a 'transition fuel' - from more polluting fossil fuels to renewable sources of energy. There is lively debate as to how long this 'transition' will last but nobody disagrees that Natural Gas will play a growing role for the next several decades and help nations move further along their journey towards net zero.

Present scenario

India aims to achieve a 15% share for Natural Gas in its primary energy mix by 2030 from the current share of under 6%. This is an enormous undertaking requiring several techno-commercial and regulatory challenges to be overcome. As per an India Energy Outlook report (2021) published by the International Energy Association, India's total primary energy demand in 2019 was 921 million tons of oil equivalent (mtoe), in which the share of Natural Gas was 55 mtoe. This primary energy demand is estimated to escalate to 1237 mtoe by 2030 and if India is to achieve the 15% Natural Gas share, demand would triple to 186 mtoe. To put this in perspective, investments in Natural Gas storage and transportation of the order of INR 1,20,000 crores would be required in the next ten years to help achieve this target.

India imports nearly half of the gas (in the form of LNG) it consumes and looking at our upstream prospects, the share of LNG is expected to grow in the years ahead.

Accordingly, critical alignment with several exporting projects internationally would also be essential to secure stable long-term supply to help achieve our 15% share target.

As of March 2023, total re-gas capacity from the existing six operational terminals located in western and southern India was 42.5 mtpa. Considering average prevailing utilisation rates in the country of LNG terminals, this an increase of between 40-60 mtpa in regasification capacity by 2030. Commissioned Natural Gas trunk pipelines stood at 18000 kms covering mainly the western, northern and small parts of the southern and eastern regions.

Dhamra LNG

This terminal comprises of relevant marine infrastructure provided by Dhamra Port for safely berthing a wide range of LNG vessels, an LNG jetty, two full containment storage tanks of 1,80,000 m³ storage capacity each, Shell Tube Vaporizers that can re-gasify up to 6.5 mtpa LNG at peak capacity, three gas engines of 9.65 MW capacity each to operate the terminal in island mode and a send out pipeline to connect to the nearby GAIL national transmission system. Indian Oil and GAIL as users of the terminal for will transport natural gas to for its captive use and marketing to other industries & city gas distribution companies in the region.



Dhamra LNG Terminal journey has its genesis in Adani Ports and SEZ (APSEZ) acquiring Dhamra Port in 2014 which lead to an investment decision for Dhamra LNG terminal in June 2017. This was the first investment for an import and regasification terminal by a private company in India. In October 2018, Adani and TotalEnergies (a French energy major) executed a 50:50 JV agreement to develop a LNG business in India and neighbouring countries which included development of this terminal. This JV has truly benefitted from the unbeatable Adani expertise in infrastructure development and TotalEnergies LNG experience and global access.

Having awarded EPC contracts, the terminal development commenced in March 2018. It was immediately obvious that developing the massive LNG tanks would be a different experience from that in existing terminals as the load bearing capacity of the soil on the eastern coast of India is typically lower. This required longer and more numerous piles at Dhamra and was one of our earlier challenges. The project was in full swing when COVID-19 struck, imposing restrictions which disrupted our man-material movement. After the first wave, it was prepared and fared much better during the second wave as we had stockpiled material and adjusted worker rota to cater for pandemic induced disruptions. Not to mention the endurance against highest Cyclones like Yaas and Amphan.

Atmanirbhar concept was at core of the LNG project execution philosophy, evidenced in the selection of EPC contractors. Apart from all civil and marine works being executed by local contractors, Dhamra LNG is the first terminal where our home-grown EPC – L&T, executed the challenging tank contract, thereby strengthening its credentials for other tenders globally.

Safety remained an unwavering focus for the team during the construction phase and in the final tally we compared favourably with HSE statistics when benchmarked with other LNG terminals globally.

The moment of truth arrived on Odisha Divas – 1st April 2023, when the TotalEnergies sourced, QatarGas delivered, Milaha Ras Laffan arrived at the anchorage of Dhamra Port. Fantastically assisted by Dhamra Port's powerful tugs, the berthing operation endured challenging wind conditions to present a perfect berthing of the first LNG vessel on the shores of Eastern India. Milaha's partial load of 26,50,000 MMBtu would be used to cool down and maintain the terminal to a cryogenic state at ~-160oC and conduct requisite performance tests to prove up the

design parameters. The ship stayed alongside for only 13 days – well within our planned laytime of 15 days.

The terminal was formally declared commissioned on 21 May 2023 and since commissioning, Dhamra LNG has already received four more cargos and is expected to make a strong ramp in the coming 12 months or so.

Jagdispur-Haldia-Bokaro-Dhamra pipeline (JHBDPL) Hinterland connectivity

The evacuation of gas in the pipeline started on 18th April 2023 through the Jagdispur-Haldia-Bokaro-Dhamra pipeline (JHBDPL). JHBDPL is connected to national grid with connection to HVJ pipeline connecting North and West India, also in northeastern part it is connected to the Indra Dhanush pipeline network connecting the seven sister states of northeast region. The network developed by GAIL which spans over 3500 kms is another infrastructure milestone as this network and Dhamra LNG were virtually commissioned simultaneously – a first in the annals of developing Indian gas infrastructure. The terminal via this pipeline will act as a primary source of Natural Gas to the states of Odisha, Bihar, Jharkhand and Uttar Pradesh. Natural gas will be supplied primarily to refineries in eastern regions and will also cater to brownfield fertiliser plants. Supply from this terminal to this pipeline network will not only enhance energy security, but food security as well because Natural Gas is the primary feedstock for fertilizer production.

What does this development mean for our country

Dhamra LNG is India's seventh operational import terminal and first in the eastern region. With a peak





capacity of 6.5 mtpa, we have added around 15% to the country's regasification capacity. On standalone basis, if the nameplate capacity is added into country's gas consumption (which could be easily achieved once connectivity to Paradip and Haldia refinery is completed), it would advance the share of natural gas to ~8% in the primary energy mix. Equally and if not more importantly, this terminal allows gas to flow from the east to the west and vice versa for the first time in our history.

The flexibility that this brings, gives us considerable leverage when sourcing cargos and weathering disruptions. During the recent Biparjoy cyclone for instance, users of Gujarat based terminals had used supplies from Dhamra terminal to cater demand in west and north India. Supply sources towards the eastern part of India including Australia, Malaysia and Indonesia will save on shipping costs when supplying to Dhamra. The North Indian gas market can now be accessed by both eastern and western LNG terminals providing choice and diversification opportunities to buyers.

There is very low penetration of Natural Gas in East India largely on account of lack of supply caused in turn by non-availability of infrastructure. Dhamra LNG has changed that as it now becomes the primary source of Natural Gas for 35% of the Indian population on account of its proximity to these markets. Having such proximity also means less transportation cost caused by compression requirements when moving gas over long distances.

Dhamra LNG also provides the opportunity to become a regional supply hub because of its ability to re-load shipments. Bangladesh has been long trying to develop LNG infrastructure on its western shore. Dhamra offers a ready alternative both via pipeline connectivity and break bulking. The truck loading bays will offer opportunities for potential buyers who desire Natural Gas but are not on the growing Indian gas pipeline network.

Summing up

All in all, Dhamra LNG terminal and JHBDPL offers much needed local infrastructure, diversification and new ways of receiving gas to a large part of the Indian market. This is a small but important step in our country's transition to a gas-based economy and I salute the courage, vision and determination of everyone who has worked tirelessly to make this a reality! Going forward, world class operation standards, throughput, continuing with record setting HSE standards remain our priority. ■

Kerosene Hydrotreater Unit (KHT) Project at BPCL Mumbai Refinery: A Journey Toward Cleaner Fuel

A refining hub and a net exporter of petroleum products, India has an installed refining capacity of 251.2 MMT as on January 1, 2022, with majority (around 65%) being held by PSU refiners and their subsidiary/joint venture companies. BPCL has oil refineries, a wide marketing network and has ventured into upstream activities as well. Overall refining capacity of BPCL is 35.3 MMTPA out of which MR's contribution is 12MMTPA.



BPCL Mumbai Refinery (MR) commissioned 1.5 MMTPA Capacity Kerosene Hydrotreater Unit (KHT) in Feb'23. The unit was integrated with existing Diesel Hydrotreater (DHT) unit whose design capacity was revamped to 2.83 MMTPA. KHT unit is strategically placed adjacent to DHT unit to optimise space and inter-unit distances through sharing of heat load, recycle gas, amine & wash water facilities. The unit upgrades raw clean distillate to produce specified products suitable for marketing as Superior Kerosene Oil, Aviation Turbine Fuel, Mineral Turpentine Oil and High-Speed Diesel. This unit of BPCL Mumbai Refinery is first of its kind in India with a capability to produce ultra-low Sulphur MTO/ SKO/ ATF products making it environment friendly.

M/s. Haldor Topsoe (HTAS) was the process licensor, M/s ThyssenKrupp (tkIS) was the PMC / EPCM for the project & M/s. Bridge and Roof was main contractors. The Project had 95 nos. of equipment including 48 over dimensional equipment.

The Project was completed & commissioned safely without any Loss Time Accident in a short duration of 22 months despite COVID-19 pandemic. This has been accomplished with dedicated efforts from Mumbai Refinery Team along with support of Stakeholders, Process Licensor, Consultant, Vendors and Contractors maintaining the allocated budget.

To complete the project on time and within budget while overcoming the challenges posed by COVID-19 pandemic, the project team adopted various execution strategies which facilitated faster execution.

Few key strategies are mentioned below

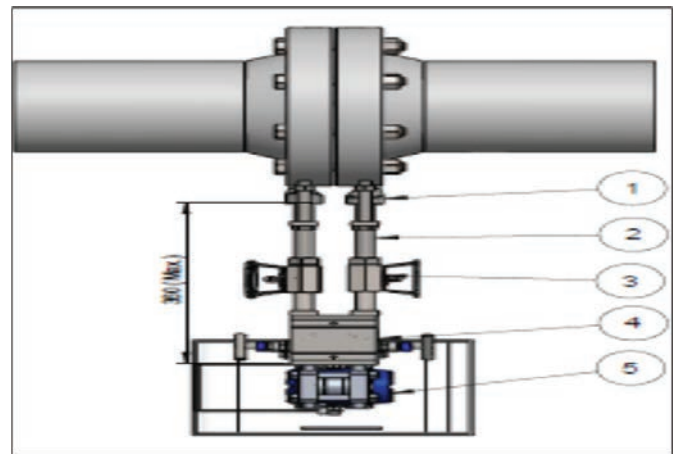
- Site readiness by removal / relocation of existing facilities to match project schedule.
- New initiatives viz. High Integrity pressure protection system (HIPPS), Prefabricated Pipe spools, Pre-fabricated Instrumentation hook-ups, Dual redundant Variable Frequency Drive (VFD) for Recycle gas compressor (RGC).
- Early commencement & completion of OSBL activities related to associated units during their respective shutdowns facilitated Project commissioning.
- Early formation of Pre-commissioning task force leading to synergy with other stake holders.
- A new warehouse for storage of project material was constructed to facilitate KHT supplies.
- Continuous interaction with Vendors for timely delivery of material
- Construction of new approach road beside project plot for simultaneous working by Multiple contractors.

New Initiatives at MR for KHT Project



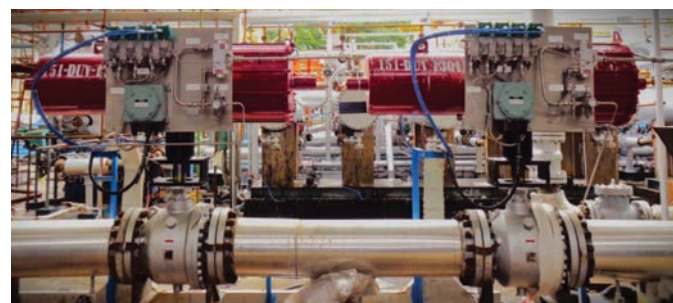
Prefabricated piping Spools: For the first time in BPCL group refineries, Prefabricated spools were used for entire project piping jobs. Use of prefabricated spools helped in reducing total procurement & construction time, enhanced safety and quality.

Prefab Instrument Hook-up: Prefabricated Instrument Hook-up were installed for measuring process pressure



and flow. Prefabricated Instrument Hook-ups are a convenient way of eliminating impulse piping by using sandwich construction valves. Use of such hookups helped in reduced testing requirements at site as it is pretested at factory, reduced no. of welding joints at site and faster erection.

High Integrity pressure protection system (HIPPS): High Integrity pressure protection system (HIPPS) is used in KHT Project. The use of HIPPS for hot feed lines minimizes flare load during power failure scenarios. With



the help of HIPPS, the adequacy of existing flare in MR was ensured.

Dual Redundant Hot Standby VFD with DOL facility for RGC : Dual Redundant Hot Standby VFD system with DOL facility is provided for KHT RGC HT Motor. It is



FEATURES

first of its kind in BPCL facilitating auto changeover from one VFD to another automatically without affecting the process parameters.



Awards: KHT Project has won IndSTT Trenchless Excellence Awards 2022 for Best Project Management, Best Project, HSE & 13th CIDC Vishwakarma Award 2022.



3 million manhours without lost time accident. Key safety features are as mentioned below:

- State of Art Process Interlocks for automatic safe shutdown.
- High Integrity Pressure protection system (HIPPS) Installed at Feed lines to make Flare KOD adequate (as per OISD 106) for revised liquid flare.
- 1 emergency depressurization valve (HP Circuit).
- Provision of HC, H2S & H2 Leak detectors at strategic locations.
- Closed Blow down & Amine Blow Down system.
- Closed loop sampling for H2, HC & Amine.
- Sour Gas processing in existing ATU facility.
- Sour Water processing in existing SWS- facility.



KHT Feed Cut-in In presence of Sanjay Khanna, Director (Refineries); M R Subramoni Iyer, ED (MR); P K Bhowmick, ED (E & AS, P & PP); R R Ghalsasi ED (RPO); N Chandrashekhar, CGM (Operations); P G Karthikeyan, GM (Projects) & other Senior officials.

Safety

Multi-tier Safety approach Including Dedicated External Safety agency for enhanced safety, helped us in achieving



KHT Project Team

“Once A SealMan Always A SealMan”



Umar AK Balwa
Managing Director
Sealmatic

Umar AK Balwa - Managing Director, Sealmatic envisioned during the time when Indian industrial landscape was in its formative years to develop a company which would produce at-par with global standards a component poised to be in high demand in the near future: Mechanical Seals. He, in this interview interaction walk us through the undertaking of building a globally renowned mechanical seal manufacturing unit- in a dynamic, challenging and highly competitive arena. He also provides insights into major growth factors, evolving customer expectations & future roadmap of Sealmatic in the Mechanical seals Industry and what sets Sealmatic apart from the rest of the competition in this space.

How do you see the current Mechanical seal market evolving in India?

The mechanical seal market has been predominantly dominated by international players over the last five decades. The technology for mechanical seal employs high precision designing and production, which was not available in the pre liberalization period.

Way back in the early 1980s, the size of the mechanical seal market was merely Rs 15 crores and today the same

has grown exponentially at Rs 1900 crores. The GDP of India is USD 3 trillion and is one of the strongest and biggest globally. The infrastructure and the core industry is growing at a rapid pace, and this will be the biggest driver for growth in the mechanical seal industry.

Having said that, back in the days there were hardly any indigenous mechanical seals company in the country, there were three big boys from Europe and USA, which totally dominated the market, until the Indian economy



IMPACT FEATURE

opened up in 1992 and created a level playing field where indigenous players like Sealmatic could acquire technology and Equipments from the western world with ease.

What are the major factors driving the growth of mechanical seals industry?

Over the years, capabilities of Indian industry has improved dramatically and paved way for induction of state-of-the-art technology in all the industrial fields, viz oil & gas, refinery, power, petrochemical, chemical, pharmaceutical, fertiliser, pump & paper, shipping, aerospace etc.

Thus, this created huge demand for high precision mechanical seals in India. Mechanical seals are designed to prevent leakage of exotic and hazardous media into the environment. More and more stricter legislations made it mandatory for the industrial plants to employ mechanical seals for all their rotary Equipments. Thus, creating demand for sophisticated mechanical seals for rotary Equipments.

What are the major expectations of customers from Sealmatic in this space?

The major expectations of customers in this field are reliability, application know how and quick after sales & service. The mechanical seal industry is highly competitive technically, it demands a proven track record while one serves for a customer's application, hence know how to design a mechanical seal for a particular application is of paramount importance.

Every mechanical seal produced is tailor made to suit individual requirements of the customers. We are well equipped and rather the only domestic company which has invested huge amounts in R & D, Designing, Quality Control & Production, we are the only mechanical seal company in the MSME segment which has been recognised by the DSIR – Department Of Science & Industrial Research under the Ministry Of Science & Technology.

How do you meet customer's expectations?

We are a team of 235 associates and out of which we have a dedicated team of 27 engineers who are employed for the sole purpose of designing individual solutions for

customers globally. We are proud to state that we are the only Indian company which has the distinction of API Q1, ISO19443, ATEX & EU FDA certification for mechanical seals.

Besides, again as a domestic mechanical seal company, we are the only one which employs FEA & CFD for hardcore design and development of mechanical seals. From our experience in this field of over 32 years, our customers benefit from the enormous data that we bring to the table in terms of application know how, trouble shooting and failure analysis, this is the key to success in this highly competitive business.

How is Sealmatic positioned in this segment?

We enjoy excellent position in this market both in terms of global and domestic exposure. Our range of mechanical seals are exported to over 45 countries and are well accepted when compared to the big boys of the industry.

Domestically we are second to none in our offerings, we provide a comprehensive package to our customers, right from the selection of mechanical seals to the installation and training of the personnel at the end user premises. We are the preferred vendor for various projects in the core industrial sector, due to our knowledge and application-based solutions that we provide for critical equipment.

What are the major factors that set you apart from other players in this segment?

Mechanical seal industry is highly competitive, it requires huge amount of time, money and energy to reach a certain level. When we started out in 2011 after ending our joint venture of 20 years with Feodor Burgmann of Germany in 2007, we consciously made efforts to set up our plant to match international standards and specifications. Not only in terms of employing hardware and software, but also implementing very high international standards and a highly trained team, we are proud to state that we have more than 100 visits from international customers to our premises and all of them have said simply one thing – "state of the art international facility".

We are proud to state that we are the only Indian company which has the distinction of API Q1, ISO19443 ATEX & EU FDA certification for mechanical seals. Besides, again as a domestic mechanical seal company, we are the only

one which employs FEA & CFD for hardcore design and development of mechanical seals.

We have tools such as MSD (Mechanical Seal Dictionary), SSG (Seal Selection Guide), AKH (Application Know How) and many other tools which has catapulted Sealmatic in the bigger league of international players. We are perceived and respected globally as a high-quality mechanical seal company.

How is Sealmatic proving itself with its heavy-duty mechanical seal with innovative and tailor-made sealing solutions?

As mentioned earlier, the business of mechanical seals entails application know how, which comes through various years one serves in this technically competitive industry, we have devoted over 32 years in this high-octane business. This requires out of the box thinking in providing solutions for very difficult and complex sealing application.

Our specialty lies in designing and providing heavy duty mechanical seals for pumps, compressors, agitators and other rotary equipment. Applications where the pressure rating exceeds 100 kg/cm², temperatures in excess of 350 degree Celsius, slurry content of very high level, media with high viscosity and so on.

Over the years we have designed and developed niche products to meet the above demanding applications, which are not only difficult to design and produce, but equally challenging to install a suitable mechanical seal in the rotary equipment with such applications.

This has been achieved from the rich data bank that we have assimilated in the last 32 years, which allows us to match such demanding application to the work that we have done in the past, plus we employ best of the raw materials, which are imported from Germany, USA and the UK, we do not compromise on the metallurgy.

What is the future roadmap for Sealmatic India and how is the company gearing up for the same?

The future of Sealmatic and the Indian industry at large is bright, and it is our rightful place to be in the forefront

of the mechanical seal industry in the global arena. We already have deliveries to more than 45 countries, we want to be physically present with our sales and service centres in every continent.

We want to be the preferred choice when it comes to mechanical seals with various customers, and we want to make India proud with our little contribution in the process of making India truly a global powerhouse.

We are continuously investing into highly trained manpower, best of the software and hardware and are imbibing latest technology available to improve our designs and processes, in short, we are investing in the future. ■

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“Navigating India’s Energy Transition: Addressing the Trilemma and Embracing Collaboration”



Neeraj Sethi
Country Director- India
Baker Hughes

India stands at the forefront of the energy trilemma, facing the challenge of balancing energy security, sustainability, and affordability. As we embark on this transformative journey, it is imperative to recognize that a sustainable energy future necessitates collective action and partnership. In this article, we delve into the hard truths, outline a dual approach to energy transition, and discuss the challenges and opportunities that lie ahead, with a particular focus on India’s unique position.

India, like many other nations, grapples with the complexities of the energy trilemma. Achieving energy security, environmental sustainability, and affordability are critical to unlocking the full potential of our nation. However, geopolitical events, the impact of climate change, and the persistence of energy poverty pose significant obstacles.

In the face of these challenges, we must confront three hard truths that underpin the energy transition.

Accelerating Technology Adoption

The adoption of current technologies is vital, but alone, they cannot achieve the ambitious goals set by the Paris Agreement. India must embrace a dual approach that combines implementing efficiency measures today with investing in new energy solutions for the future. By accelerating technology adoption and fostering innovation, we can bridge the gap and meet our net-zero targets.

Coexistence of Energy Sources

It is crucial to recognize that the complete elimination of hydrocarbons is neither feasible nor practical in the short term. Oil and gas will continue to play a vital role in India's energy mix for the foreseeable future. However, to ensure sustainability, the focus should be on enhancing energy efficiency and reducing emissions associated with hydrocarbon production.

The Power of Partnerships and Collaboration

No single entity can navigate the energy transition alone. Collaboration between industry players, technology providers, policymakers, and the community is essential. By embracing common sustainability standards and working together, we can collectively drive the transition towards a sustainable energy future for India.

India's energy transition requires a dual approach that addresses both immediate challenges and long-term sustainability.

Efficiency Measures Today

We must prioritize the deployment of energy-efficient technologies across various sectors, including oil and

"No single entity can navigate the energy transition alone. Collaboration between industry players, technology providers, policymakers, and the community is essential. By embracing common sustainability standards and working together, we can collectively drive the transition towards a sustainable energy future for India."

gas operations. By adopting the most efficient and least emissive technologies, we can significantly reduce emissions and improve the sustainability of our energy infrastructure.

Investing in Future Energy Solutions

Simultaneously, we must invest in sustainable energy technologies to diversify our energy mix and reduce dependence on traditional fuels. Renewable energy sources, such as solar and wind, offer tremendous potential for India. Collaborative efforts between industry and policymakers can accelerate the adoption and deployment of these technologies, ensuring a sustainable and resilient energy system.

India's energy transition presents both challenges and opportunities that require careful consideration.

To expedite the energy transition, we must foster a culture of innovation and fast-track the adoption of transformative technologies. By creating an enabling environment for technology development and deployment, we can overcome barriers and drive progress.

India needs a robust and supportive policy framework that incentivizes investments in sustainable energy solutions. Reasonable and rational policies will create a level playing field, attracting investments and fostering long-term growth.

Investments in the energy transition must be financially viable and produce returns. Access to capital is essential for scaling up sustainable energy projects, ensuring their economic viability while driving positive environmental outcomes.



As India navigates the energy transition, certain principles can guide our path to success:

- **Embrace Disruptive Change:** Recognize that disruptive change is the new normal in the energy sector. Be prepared to adapt and innovate, leveraging emerging technologies to drive sustainable solutions.
- **Foster Collaboration:** Actively engage and collaborate with diverse stakeholders, including industry leaders, technology providers, policymakers, and local communities. By fostering collaboration and knowledge-sharing, we can advance better shared outcomes.
- **Transparency and Trust:** Build trust among all stakeholders by transparently addressing the challenges and trade-offs associated with the energy transition. Back up claims and commitments with verifiable data to maintain a social license to operate.

India's energy transition Journey

It is a complex yet transformative journey. By embracing the hard truths, pursuing a dual approach, fostering collaboration, and working with partners like Baker Hughes, India can address the energy trilemma and drive the nation towards a sustainable and prosperous future.

As an energy technology company, Baker Hughes stands apart from service companies for its ability to offer truly differentiated technology at scale across a variety

of energy sources—from oil and gas to alternative and renewable energy.

The scope and scale of our portfolio gives us a unique advantage to bring the most complete suite of low-carbon solutions to energy and other industrial markets. This is a capability our customers require and look for to reduce the carbon intensity of their operations, particularly on major projects. We also continue to innovate on new low-carbon products and services to help our customers reduce their emissions from oil and gas operations as well as to support the future energy mix that includes a range of alternative and renewable energy sources.

Our existing capabilities in carbon capture, use and storage; hydrogen; and energy storage, for instance, are becoming more relevant. We aren't new to these areas. We have been engaged in these areas for decades.

- Hydrogen since 1962.
- Geothermal since the early 1990s.
- CCUS since the early 2000s.

These are all areas in which core technology can be applied today as our customers lean into the energy transition, all while we continue to innovate to further advance these technologies for tomorrow.

Together, let us shape India's energy landscape, ensuring a cleaner, more resilient, and inclusive tomorrow. ■

Refinery-Petrochemical Integration: India



Refineries have traditionally been designed to maximize fuels as final products. These products have primarily meant gasoline, diesel, and jet fuel. However, this process has generally resulted in underutilization of opportunities to extract higher-value products. Going back 30 years, the priorities of refiners have been to provide these traditional fuels. However, balance naphtha has emerged to provide an alternate business model. That's the reason refiners should be thinking seriously about integrating petrochemicals into refineries.

Today, as India looks toward a future of steadily declining consumption of hydrocarbon-based fuels, due to fair consideration being given to climate impact, other products such as petrochemicals deserve a look.

Global warming and depleting resources of crude oil — expected to decline in India by 2040 have already given impetus for finding alternate energy sources other than conventional refinery products i.e. Petrol and Diesel.

Petrochemical Growth

What are Petrochemicals? Petrochemicals are chemical products derived from petroleum.

Following are some examples:

- **Ethylene:** Used in paper, consumer electronics, detergents, footwear, and adhesives.

- **Propylene:** Used in paints, furniture, textiles, pharmaceuticals, and food packaging.
- **Benzene:** Creates pharmaceuticals, furniture, electronics, and food packaging.

Based on various market research, the petrochemical industry is expected to expand at a compound annual growth rate (CAGR) of 6.0% to 8.0% from 2023 to 2030.

The integrated complex provides optimum molecule management for a better return on investment. The utilization of byproducts from fuel processes to produce other chemical products is already resulting in growth of the petrochemicals industry. The growth in the number of end products resulting from crude processing is improving refinery margins and shows signs of continued enormous growth over the coming years.

The overall Indian economy stands to be a big winner from this pivot towards petrochemicals as integrated refining and petrochemicals would drive down the need to import

| Factors Defining the Evolution of Indian Refineries | | |
|---|---|---|
| Search for alternate fuel | | |
| Petrochemical growth | | |
| The dynamics of the downstream market | Premium available in olefins vis-à-vis transportation fuels | <ul style="list-style-type: none"> · Stability over value chain · Flexibility to the dynamic market demand and prices |
| | <ul style="list-style-type: none"> · Feedstock and product flexibility · Absorption of return streams | Capital, OPEX and resource optimization |
| | Upgrade low value refinery streams to high value products | |
| Advances in refining technologies | | |

these products. Petrochemical feedstock accounts for about 12% of global oil demand currently. This share is expected to increase over the near and intermediate terms as demand increases for plastics, fertilizers, and many other petroleum-derived products.

Various established refiners/ companies are already working towards identifying technologies that could deliver improved performance and efficiency across the oil and gas value chain. This drives the technological advancement and Indian refiners needs to develop or adopt to these advances.

Integration of Refineries and Petrochemical

Based on factors noted above, the current fleet of refineries in India will ultimately need to implement a road map to capture opportunities for petrochemicals integration. A few significant elements of that road map may include

- **Deploy Advanced Technology:** Conventional refineries were designed to withstand demand without consideration of future scope. However, current advanced technology can help to cope with future expansions.



- **Stream Selection:** In order to manage the product pool, the feedstock selection should be done in the conceptual stage.
- **Market Study:** Entering the market in the correct market cycle is very important. This entry timing is less important for refineries but highly important for petrochemicals.
- **Staggered Startup:** Due to differing needs, startups for refineries and petrochemicals need to be carefully planned upfront to manage utilities and product pools.
- **Correct Integration:** Most of the time, incorrect integration will reduce or eliminate economic viability of high-value products.

Advantages of this Integration

- Upgradation of refinery streams to marketable products.
- Waste minimization.
- Savings on working capital.
- Higher monetary benefits.

Key Questions for Informed Integration Decisions

With the improving economics of integration of petrochemical with refinery products, a few key questions need to be considered:

- What are the precise synergies that can be achieved?
- Will integration support the transfer of hydrocarbons, utilities, or both?
- How will olefins or aromatics be processed?
- What are the alternatives to the site in terms of displaced streams?
- Does integration offer the best economic solution?
- Is the asset in a cluster of industries that prohibits material changes to the feed/product/energy balance mix?
- Does the change make sense for the operation, or will it force others to spend more capital to change their business?

Sustainability and Flexibility of Integrated Refinery and Petrochemical

The migration from refining-only to refining-plus-petrochemical operations is an option that should be considered by Indian refineries.

During the COVID-19 pandemic, for example, one refiner reduced fuel gas production and diverted feed towards raw material needed to produce LPG, masks, and PPE suits. This helped fill demand for urgently needed materials while maintaining business during the worst of the pandemic when demand for the product was high.

Accelerating demand for transportation fuels, and even higher demand for olefins, biodegradable detergents, and aromatics, will help refiners maintain margins while meeting emerging demands.

With the current growth of the Indian population and steady increases in purchasing power, demand for these products will push Indian refiners to expand more rapidly into production of petrochemicals.

Conclusion

The migration of only refining to refining plus petrochemical is imperative considering high future consumer demand and high margins for refinery owners. Global demand for sustainable environmental practices and new products with lower carbon intensity means the time is right for Indian refiners to begin the transition with correct technology.

A rising middle class in India and China is driving high demand for petrochemical-based consumer products. It seems nearly certain that this pivot toward petrochemicals will be an increasingly significant factor for Indian refiners in the decade to come. ■

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Why should you use Tapflo plastic AODD pumps in the chemical industry?



is a thermoplastic polymer with superior chemical resistance. The PTFE pump can handle even the most aggressive acids. The maximum liquid temperature is 110°C.

Tapflo also supplies Barrier Diaphragm Pump (available in PE and PTFE) that are equipped with a barrier system on both sides of the pump. It protects the pump internals from chemical attack in case of diaphragm break and, with dedicated accessories, also protects the environment from contamination and product from waste.

There are multiple chemical pump options on the market today that can be used to transfer hazardous fluids such as solvents, acids, petrol and alcohol. Tapflo manufactures suitable solutions for the chemical industry using high-quality, premium materials to ensure a long life of your pump.

All Tapflo Plastic Diaphragm Pumps (Air Operated Double Diaphragm Pumps) are made from polyethylene (PE) or virgin PTFE and are suitable for handling almost any kind of liquid whether it is viscous, chemically aggressive or with solids.

Polyethylene (PE) has a superior wear resistance which is 6 - 7 times better than for polypropylene (PP). This fact makes the pump suitable for handling abrasive slurries etc. PE is resistant to most kinds of aggressive chemicals such as concentrated acids and alkalis. Maximum liquid temperature is 70°C. Tapflo uses different grades of PE depending on the part. For valve seats and ball stoppers, which are most vulnerable to wear - UHMW PE1000 is used for best mechanical strength and abrasion resistance. PTFE (polytetrafluorethylene)

Tapflo diaphragms are of composite construction, superior for continuous heavy-duty service, with a completely smooth surface in contact with the liquid.

Our TD series Drum pumps are designed for mobility, easy and safe handling. They are mostly used for unloading barrels and IBC containers.

If you need pumps that are intended also for use in explosion hazardous environments Tapflo can offer ATEX rated pumps that can be utilized in Ex-zone 1 and Ex-zone 0. The conductive material ensures that no electrostatic loads will be accumulated on the pump. The conductive pigment in the material reduces the surface resistance. Transfer of alcohol and solvents are examples of applications for the Tapflo TX and TZ pumps. ■

For more information about our Diaphragm pumps for chemical applications, take a look at our website <https://www.tapflo.com/en/diaphragm-pumps/pe-ptfe-pumps>

Optimize Flow Loop Processes to Significantly Improve Energy Efficiency



A typical processing plant such as an oil refinery can incorporate hundreds or thousands of pumps. They consume as much as 60% of the facility's energy usage.

That's why a major oil and gas company partnered with Flowserve to evaluate their situation and develop a plan to address potential energy cost savings within various refining processes at one of its production facilities in Western Europe. The total electrical power consumption of the pumping systems in the study was approximately 40,000 MWh per year.

Together, we conducted a pilot project that analyzed actual operating data for 15 critical service, high-energy pump flow loops. The pumps and control valves in these systems had been supplied by Flowserve and other flow control equipment manufacturers. The study found that by modifying the flow control equipment, overall flow loop efficiency (or specific energy) could be improved and thereby significantly reduce the customer's operating costs and improve their carbon footprint.

When the plant operator completes implementation of the recommendations, energy consumption of this equipment will be reduced by approximately 35% from

the prior year. Payback on the investment in equipment upgrades is comfortably within the plant's threshold for return on investment (ROI).

Understanding performance for a broad range of equipment

In a consultative approach, Flowserve specialists partnered with the refinery operators to undertake an operational assessment of the installed flow control equipment. A systematic data-driven evaluation process along with Flowserve's engineering expertise allowed us to identify and achieve significant improvements in overall flow loop efficiency.

Calculating hidden costs and quick ROI

Flowserve analyzed two years of performance data from the refinery's pumps and control valves and studied the pump flow loops to identify opportunities for improvement that met the refinery operator's minimum ROI targets.

In instances where process data was not available, our experts utilized proprietary analysis tools to estimate the process performance data.

FEATURES

Energy savings of 35% annually

Within eight weeks, Flowserve proposed solutions that would result in an overall annual energy savings of 35%.

The study included a review to determine whether any of the pumps were “bad actors”, which meant they were operating with frequent repair events, negatively impacting maintenance costs, disrupting plant operations, and potentially risking production. Our experts recommended corrective actions that would address the bad actors we had identified and enable them to operate more reliably.

Comprehensive turnkey solution

The proposal presented a complete, turnkey solution from Flowserve, which included:

- Data gathering and solution analysis and definition
- Program management to align execution timing with the site
- Delivery of all necessary equipment modifications
- Testing to verify efficiency gains
- Monitoring program (reference ISO 50001 energy management program requirement on monitoring to maintain gains) to measure and track efficiency loss over time



The monitoring program was RedRaven from Flowserve, which enables companies to realize the full benefits of the internet of things (IoT) and predictive analytics to continuously monitor efficiency performance.

The program management approach categorized equipment upgrades in terms of when the modifications could be implemented (i.e., during normal operations, during routine maintenance cycles or wait for turnaround) to enable seamless execution within normal refinery operations.

Accelerate your energy transition plan

Optimizing pump efficiency is an increasingly important consideration toward the achievement of sustainability goals. The Energy Advantage Program from Flowserve offers a suite of solutions focused on enabling significant efficiency, reliability, and carbon reduction improvements from the optimization of flow control loops.

The Energy Advantage Program can quickly enable your company to start achieving operational cost objectives and accelerate progress toward realizing your decarbonization goals. Partner with Flowserve to implement the program and then monitor the savings on an ongoing basis to ensure that your company continues to meet energy efficiency targets.

Flowserve specialists share our unparalleled experience in implementing solutions to optimize pump efficiency around your process needs.

Methodology used

Flowserve uses a systematic process and data-driven approach to identify and prioritize opportunities for efficiency and operational gains. Flowserve combines the system-level understanding of flow control component interaction with OEM product expertise for each of the main components to identify and act on energy optimization opportunities in flow loops.

A customized contracting and execution model can then be developed to implement solutions, delivering

| Refinery pump assets | Annual energy cost savings estimates (millions) |
|----------------------|---|
| 1,000 | €2.5 to 5 |
| 2,000 | €5 to 10 |
| 3,500 | €9 to 18 |

Source: Flowserve internal research (2022) based on 60% of pumps being operational, an average rated power of 50 kW for refinery pumps, 8,500 operating hours, 20 to 40% savings potential, 80% successful assessments at €0.06/kWh



fast results while aligning schedules to achieve minimal impact to normal site operations. Adjusting and monitoring resultant savings is important to maintain achieved results.

These are a few of the best practices identified in the pilot study conducted by Flowserve in partnership with this large refinery operator.

A significant reduction in operational expenses can be achieved; Flowserve typically estimates 20 to 40% energy savings for similar projects. Using the results of this pilot project, the annual energy cost saving range potential for your company's project can add up to millions.

Commitment to energy transition

At Flowserve, our approach to energy transition begins and ends with our purpose: to make the world better for everyone. We understand that when we enable our customers to tackle climate change and address increasing energy demands through our innovative flow control solutions, we can make the world better — now and for generations to come.

Our approach is threefold. We are diversifying, decarbonizing, and digitizing to support the global energy sector's transformation toward low-carbon sources.

Diversification

Our innovative portfolio of flow control solutions and services will support energy systems around the world

to diversify the energy mix and adopt cleaner sources of energy.

Decarbonization

We will support the reduction of energy-related CO₂ emissions across the mix of energy sources through our innovative portfolio of flow control solutions and services.

Digitization

We will enable improvements in efficiency, productivity, sustainability, and safety of energy systems around the world through our digital solutions and services. ■

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Oil & Gas and Power sector: Driving Business Transformation through Sustainable Supply Chains



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Globally, in the last 12 months project sector has performed well as compared to previous 2 years when world was battling against Covid pandemic and consequent slowdown in almost all sector except healthcare. Increase in the demand has been fuelled by capital expenditure outlay on mature hydrocarbons and power, mature renewables and cleantech and energy transition projects, beside infrastructure development and construction sectors. At the same time, there has been muted performance or decline in project sectors impacted by ongoing Russia-Ukraine war in the affected EU region. However, many other negative factors such as high inflation and stressed financial sector have pushed the large global economies in to recession leading to certain hold back position on capex decisions by affected sectors.

All above developments are essentially pointing to increased activities in entire global supply chain where 'disrupted supply chain' is almost new normal and no stakeholders can claim to be not affected due to numerous breakdowns in global supply chains from time to time.

Therefore, there is immediate need to re-look at the existing supply chain more holistically than before for ensuring it remains agile, resilient and proactive to meet business requirements. And this also offers opportunity to transform the entire supply chain with respect to alignment with sustainability objectives which help supply chains to be not only sensitive and caring to planet but help to achieve the major business objective of Deliver MORE from LESS.

World over EPC companies have been aiming to achieve significant progress to transform their supply chain to meet sustainability objectives for business. While there are many ways specific to each industry/sector to address the sustainability requirements, there are some established and best practices have now emerged which has helped many large companies to achieve their stated goals on sustainability.

Even before embarking on the journey to transform business processes, its important to understand what does sustainable supply chain means to business? As experts have defined and is also widely known, sustainable supply chain refers to the management and integration of environmental, social, and economic

considerations throughout the entire supply chain process, from the sourcing of raw materials to the delivery of products or services to end consumers. It involves adopting practices that minimize negative impacts on the environment, respect human rights and labour standards, and contribute to the long-term economic viability of all stakeholders involved.

Benefits of implementing a sustainable supply chain include reduced environmental impact, improved brand reputation, enhanced risk management, increased operational efficiency, cost savings, and access to new markets and customers who prioritize sustainability.

To achieve a sustainable supply chain, organizations require a strategic approach to assess their supply chain processes, engage suppliers and stakeholders, set clear sustainability goals and targets, integrate sustainability criteria into supplier selection and evaluation, monitor performance through metrics and reporting, and continuously improve practices based on feedback and emerging sustainability trends. Here are some key points to help achieve this goal.

Understand industry-specific sustainability challenges: Recognize the unique environmental and social challenges in the oil and gas sector. These may include greenhouse gas emissions, water usage, waste management, ecosystem impacts, health and safety, and community engagement. Gain a deep understanding of these challenges to develop effective sustainability strategies.





Develop a sustainability strategy: Create a comprehensive sustainability strategy that aligns with business objectives. Identify specific goals and targets for sustainable supply chains within the EPC sector, considering aspects such as reducing emissions, minimizing waste, and improving social responsibility. Ensure your strategy accounts for the entire project lifecycle, from design to construction and operation.

Set clear sustainability goals: Start by defining your sustainability objectives and setting measurable goals. These goals should align with overall business strategy and reflect commitment to environmental, social, and economic sustainability.

Conduct a supply chain assessment: Assess current supply chain to identify areas where sustainability improvements can be made. This assessment should consider environmental impacts, such as carbon emissions, water usage, and waste generation, as well as social factors like labour rights and working conditions.

Engage suppliers committed to sustainability: Collaborate with suppliers that share commitment to sustainability. Prioritize suppliers with established sustainability practices and encourage others to adopt sustainable approaches. Evaluate suppliers based on their environmental performance, social responsibility, safety records, and adherence to industry standards. Establish clear sustainability criteria for supplier selection.

Incorporate sustainability requirements into contracts: Integrate sustainability requirements into contracts. Include specific clauses that outline expectations for suppliers to comply with sustainability standards and provide evidence of their sustainability practices. This can cover aspects like emissions reduction targets, waste management plans, worker health and safety measures, and community engagement activities.

Foster innovation and technology adoption: Encourage innovation and the adoption of technologies in the supply chain processes to bring predictability of demands to plan

better in advance. Simplify and standardise supply chain processes across geographies and operations to reduce the complexity and non-contributing layers. Explore and implement solutions that reduce environmental impacts, such as using renewable energy in warehouses and increase share of vehicles run on alternate fuels including electric, reduce the freight miles and find alternate modes and ways to ship cargo.

Promote transparency and traceability: Enhance transparency and traceability within supply chains. Implement systems that enable tracking and reporting of environmental and social performance indicators throughout the project lifecycle. This includes tracking the carbon footprint of every leg in the supply chain irrespective of status of stakeholder. Utilise digital solutions and emerging technologies like blockchain to improve transparency and traceability.

Monitor and report progress: Establish key performance indicators (KPIs) to monitor and measure the sustainability performance of supply chain. Regularly report on progress to stakeholders, including clients, investors, regulators, and local communities. Transparent reporting builds trust and demonstrates commitment to sustainable practices.

Continuously improve and learn: Embrace a culture of continuous improvement and learning. Regularly evaluate your sustainability initiatives, identify more areas for improvement, and implement corrective measures. Stay updated on emerging trends, best practices, and regulatory changes in sustainable practices within the oil and gas sector.

Engage with stakeholders: Involve employees and customers in sustainability journey. Educate and train employees on sustainable practices and encourage their active participation. Engage customers by communicating your sustainability efforts and offering sustainable products and services that align with their values.

Collaborate with industry initiatives: Engage with industry initiatives and organizations focused on sustainable supply chains. Collaborative efforts can help drive systemic change and provide opportunities for shared learning and best practice sharing.

By following these steps, one can drive business transformation through sustainable supply chains in the EPC sector of the oil and gas industry, contributing to a more sustainable and responsible approach to project delivery. ■

Global Perspective: Oil & Gas Reserves & Production



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In early 2022, the petroleum industry witnessed a gradual recovery from the effects of the Covid-19 pandemic. Demand for energy in general and fossil fuels in particular was on track to recover to pre- pandemic levels. But the net zero 2050, the energy transition, and the calls for ending the ICE (Internal Combustion Engine) cars, were some factors that made many energy companies reluctant to spend on exploration as uncertainty dominated the markets.

The Organization of Arab Petroleum Exporting Countries- OAPEC- is an intergovernmental organization that comprises 11 Arab producing countries, namely: Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, Syria, Tunisia, and UAE. It was established in 1968, with Kuwait as domicile and headquarter.

The main objectives of OAPEC are to

- Take adequate measures for the coordination of the petroleum economic policies of its members and assist them to exchange information and expertise.
- To utilize the member resources in establishing joint projects in various phases of petroleum industry, such as: Arab Maritime Petroleum Transport Company (Egypt), Arab Shipbuilding and Repair Yard Company (Bahrain), Arab Petroleum Investments Corporation (Saudi Arabia), Arab Petroleum Services Company (Libya), and Arab Petroleum Training Institute (Iraq).

How 2022 looked like

The number of exploration licensing rounds worldwide has fallen in 2022 to its lowest level since 2019. The number of contracts signed in the oil and gas sector in the third quarter of 2022 dropped to 1,542 contracts, which is a decline of 7% comparing to the number of contracts signed in the second quarter of the year.

Actually, the gas market turmoil, along with many other factors such as the cold winter, the response to the crises worldwide, the security of oil routes, and many other issues; have led gas prices to reached unprecedented levels. This has boosted the demand for oil and coal, and casted a shadow over the global economy, just to add more clues to the fact that cutting spending in the upstream industry is not exactly the best move to be taken. The world became aware of this fact in late 2022 and started to react swiftly.

The Asian region witnessed an increase in the number of licenses in Malaysia, Indonesia, India, and Pakistan compared to 2021. India -for example - called foreign companies to contribute to the development of its gas discoveries in very deep waters (2850 m) in the "KG-D5" basin area.

In South America, Guyana announced in December 2022 a licensing round for 14 new offshore blocks.

In Ivory Coast, a plan was set for early production from the giant Baline field, which was discovered in in 2021, and it is planned to produce in late 2023. Starting up such a project within 3 years is a landmark in the petroleum industry.

In Europe, and in a move that reflects the extent of vulnerability to both the geopolitical crisis between Russia and Ukraine, and the energy demand issue, the United Kingdom increased its gas production in the

first half of 2022 by about 26% compared to the same period of 2021. Although most of the increase came from two new fields, but some volumes resulted from a change in the UK's policy towards closing some mature fields, in an effort to increase energy supplies as much as possible to meet supply shortages. The North Sea Transition Authority launched a licensing round on October 7, 2022, including 898 blocks. NSTA said on its website that: Security of supply and net zero should not be in conflict.

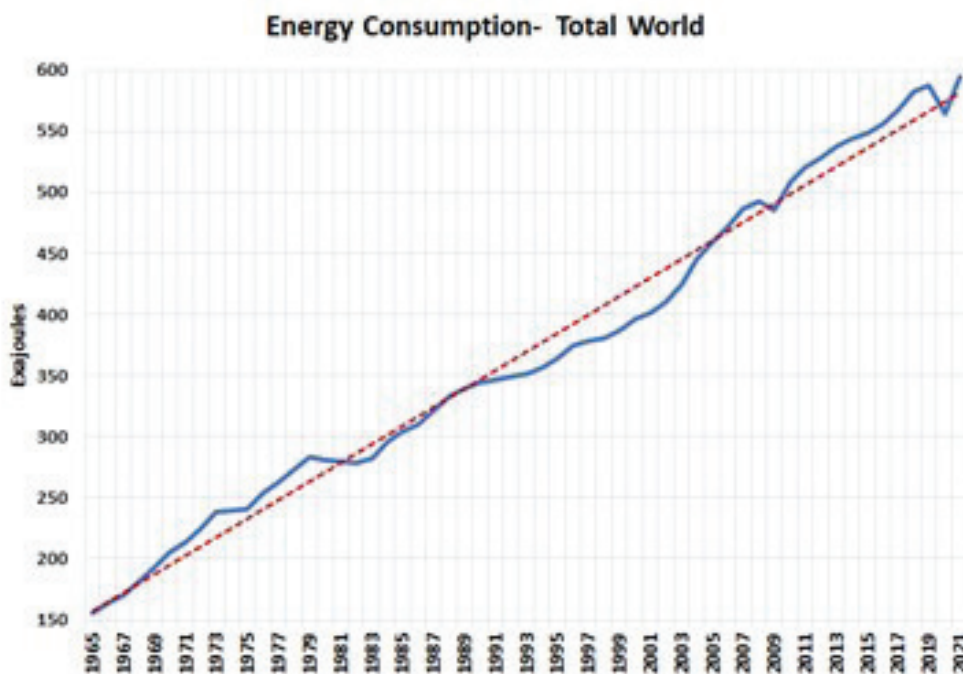


Fig 1: World Energy Consumption

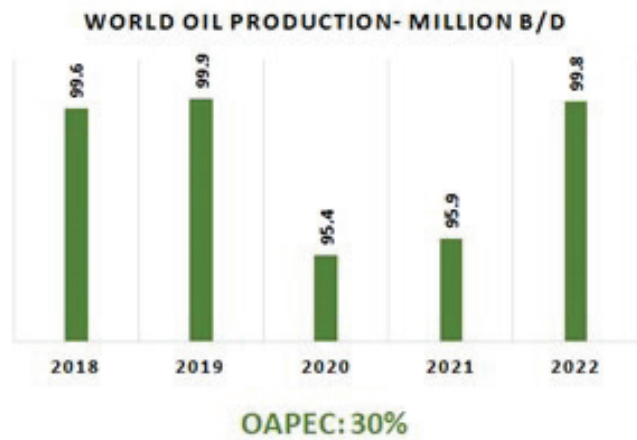


Fig 2: Share of OAPEC/World Oil Production

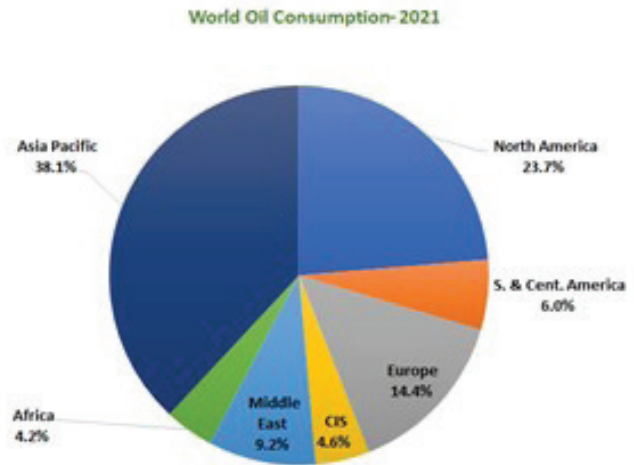


Fig 3: Oil Consumption by International Grouping

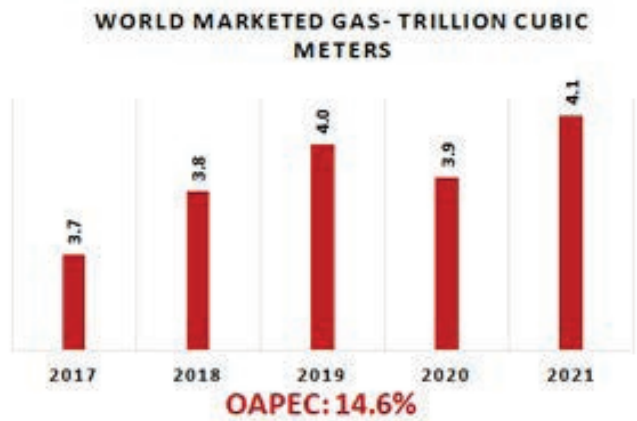


Fig 4: Share of OAPEC/World Marketed Gas

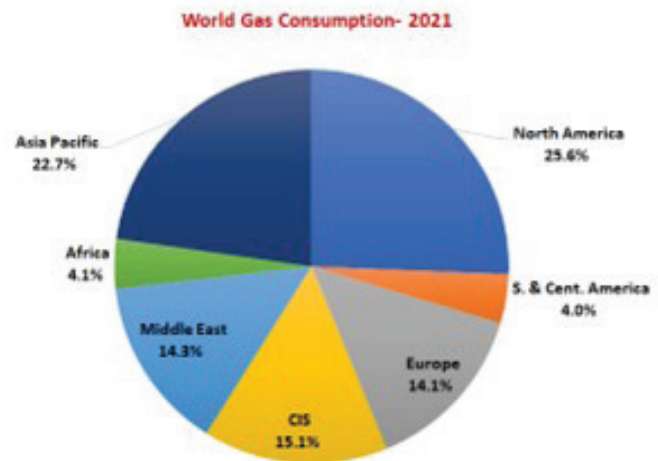


Fig 5: Gas Consumption by International Grouping

In Norway, a major energy company has earmarked more than \$935 million to develop gas and condensate production in the Sea. This comes in the context of Norway's announcement that it will continue to explore for oil and gas during the next four years, despite previously announcing its intention to reduce its greenhouse gas emissions by 55% in 2030.

On the same level, USA -in November 2022- has eased sanctions on Venezuela. Chevron obtained a six-month license from the US Office of Foreign Assets Control (OFAC), allowing the company to produce crude oil and petroleum products from its projects in Venezuela, and to import diluents that help produce Venezuelan extra-heavy oil, provided that all production is exported to the United States.

Geopolitics Effect

Geopolitical crises can play an important role in redrawing the maps of demand and supply. The geopolitical effects on the petroleum industry are clearly visible, and they have contributed -throughout the history of this industry- in changing the shape of supply and demand scenarios in a way that was not taken into any account.

Perhaps the most prominent of these crises in the current decade is what the world witnessed after the Russian-Ukrainian crisis, when most European countries paused or even retreated from their plans to limit the use of fossil fuels, after they found that these sources are bulwarks against the specter of an energy crisis that renewable energy sources cannot contain.

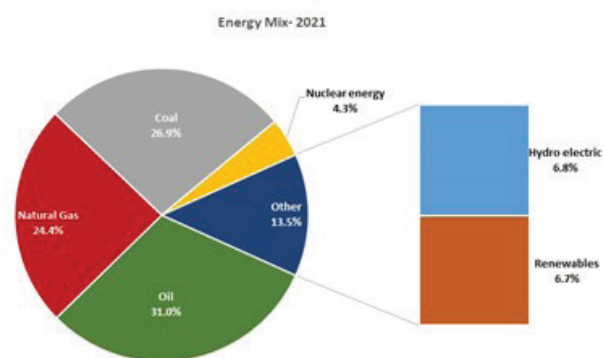


Fig 6: World Energy Mix 2021

Economic crises in turn can also play a significant role in changing the perspective of future supply and demand scenarios, a close example was the case in the first decade of the twenty-first century, when an economic crisis hit the world in late 2008. Oil prices before that crisis reached record levels of about \$147/barrel, then prices collapsed in January 2009 to less than \$34/barrel, and this was accompanied by a change in the future perspective of companies' budgets.

World Oil and Gas Reserves

According to OAPEC estimates, and despite all the hostile conditions that prevailed in 2022, world oil and gas reserves and production have increased. World conventional oil reserves stand now at more than 1.33 trillion barrels.

The world produced some 36.4 billion barrels of oil in 2022, that is roughly 1.4 billion barrels more than 2021 production. About 30% of this production came from OAPEC members who hold about 54% of world reserves (nearly 617 billion bbls). The world proven gas reserves reached over 211 trillion cubic meters, about 26% of this is in OAPEC countries. Marketed gas in 2021 reach 4.1 trillion cubic meters, OAPEC marketed 0.59 tcm of that.

Demand Scenario

In fact, all future- demand scenarios show that the global demand for energy is constantly increasing within the work- as- usual case, this includes the growth of demand in the producing countries themselves, which means that the volumes available for export will shrink if the current production rates remain constant, not to mention the possibility of a decline in these rates in the event of a decrease in investments.

OAPEC believes that oil and gas will represent about 50% of the energy mix in 2045. Coal could meet about 17-21% of the demand, this means that fossil fuel resources will collectively meet between 67-71% of the total global demand, while the rest (29-33%) will be sourced from nuclear, hydropower and renewable energies, considering that the share of renewable energy sources (solar and wind), after more than 20 years of expansion and research, formed about 6.7% only of the global energy mix in 2021.

Actually, it will not be easy for oil and gas to meet -at least- half of the global energy demand within the next two decades in the event of lower investments in the petroleum industry. The world will consume about 800-870 billion barrels of oil until 2045, which is equivalent to about 60-65% of the total proven reserves of the world in 2022. This means that there is an urgent importance to compensating the quantities produced, either through new discoveries, or by adopting improved oil recovery techniques, noting that during the past years, new discoveries from giant fields have declined and are less than the previous ones, whether in terms of number or size.

Clean Energy Perspective

OAPEC recognizes the importance of facilitating access to clean energy technology research, The Saudi Arabia Green Initiative; states clearly that "Achieving a green future is a global imperative". New sophisticated refineries to supply the international market with clean fuel products are realized in UAE, Saudi Arabia, and Kuwait. Pushing the envelope on environmental sustainability, plans are set to Carbon Capture and Sequestration in Egypt and Saudi Arabia.

Since 2016, UAE's "Al -Reyadah" facility started processing the CO2 captured from Emirates Steel Industries and injecting it into onshore oilfields to safely store the CO2 while enhancing oil recovery.

OAPEC encourages investment in clean energy infrastructure. Yet, the foresaid examples and many more, show -and prove- that when it comes to urgent short-term solutions, as well as to long term energy- security issues, fossil fuels are the only available answers to date. Energy is an integrated industry, and fossil fuels are part of the solution to a better environment, they were and will continue to be -for a long time- the backbone of the energy mix. ■

Proactive Category Management for Era of Volatile Prices

The volatile and sudden changes in commodity prices experienced in recent years are expected to persist in the future. Companies lacking the necessary resources to effectively handle the risk associated with such sharp and rapid price fluctuations could face significant financial losses posing a significant threat to the sustainability of their business.

The prices of key components like steel, food grains and logistics have undergone substantial fluctuations driven by factors such as shifting international trade policies, the war in Ukraine, shipping delays and ESG-related pressures. Consequently, numerous organizations have been compelled to either stockpile excessive amounts of materials or confront severe shortages. The repercussions of these factors have reverberated throughout the supply chain.

Although many companies possess risk-management expertise, only a few integrate this capability into their sourcing department. Typically, buyers lack access to timely information to adequately analyze, anticipate and effectively respond to market price fluctuations. They often also lack the right tools to manage the intricate risks associated with purchasing commodities, despite it directly impacting a significant portion of the cost of goods sold.

They unfortunately have to rely on suppliers to provide them with market information and, as a result, enter into negotiations at a disadvantage. This has meant that

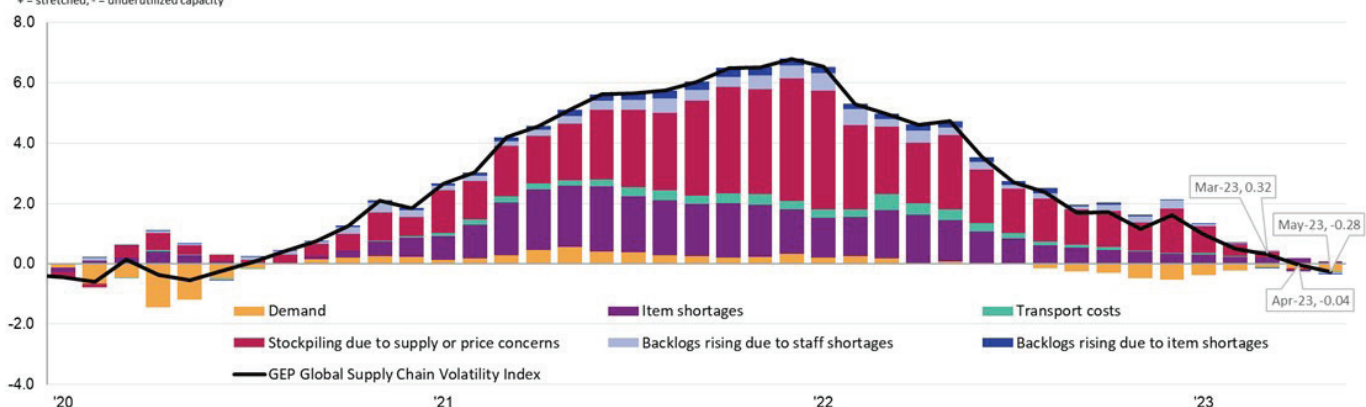
proactive category management has become an essential survival strategy in the competitive marketplace.

Need for Proactive Category Management

The majority of category management approaches are primarily reactive. It involves updating and analyzing the category after a specific aspect has already encountered a failure. In contrast, a proactive approach strives to anticipate and address potential issues before they arise, thereby mitigating challenges before the start of the procurement cycle. However, buyers often face issues like:

- Lack of visibility into internal and external insights that leads to delayed action by category managers, leaving a lot of value on the table
- Inability to forecast or predict disruptions, changes in supply, suppliers, and risks in the supply chain, impacting project lead time and costs

GEP Global Supply Chain Volatility Index
+ = stretched, - = underutilized capacity



Sources: GEP, S&P Global.

Where Do You Begin?

Procurement leaders often end up in tough spots where, despite all the planning and strategic category planning efforts, they struggle to meet yearly or quarterly savings targets. But they can offset this by creating and monitoring the right category-specific opportunity assessments.

Effective monitoring of category-specific opportunity assessments

To assess the effectiveness of current strategies and identify areas of improvement, the category plan should:

- Monitor category spend and identify trends by business unit, region and supplier
- Monitor category strategy over a period of time and create a project to track a category for analysis
- Monitor supplier regional spend, spend by payment terms, actual vs. budgeted, contracted vs. non-contracted spend by category, etc.
- Monitor supplier profiles and statistics to track performance on key metrics

While these parameters address internal risks, it is imperative to incorporate external risks and consider their impact as well.

The second step is to directly integrate external data with spending analytics and compare them with external market insights indices. This allows category managers to track performance to market, incorporating holistic procurement process data along with integrated commodity and internal and external constraint data.

Elevate your strategy with the dynamic cost model

A cost model is a critical tool for category managers to obtain greater visibility and understanding of the true costs required to produce a product or deliver a service. Should-cost technology uncovers the cost drivers and leads to overall cost savings through the identification of cost-saving opportunities and enabling improved product/service development and optimal pricing and every dollar saved drops straight to the bottom line.

At this moment, most category managers lack a unified perspective on all these steps.

Selecting appropriate tools to gain a holistic perspective

Having access to a centralized platform with access to spend and market intelligence data would enable category managers to develop strategic plans without being weighed down by the predominantly manual workload.

Using the wish list below, category managers can equip themselves with an effective category management tool:

- A holistic view of the health of the category based on external as well as internal events
- Access to industry-adopted pricing and engagement models, category-specific benchmarks, and prepopulated cost models and cost drivers
- Seamless integration with spend analytics to view realized savings at any given point
- AI-initiated recommendations and automated alerts, which help proactively track market developments and alert the user to these changes

How a Leading Oil & Gas Company Transformed its Category Management

Background

Within a global corporation, coordinating efforts between dispersed teams can be a daunting task. This was the challenge facing a company, which had category managers and sourcing executives scattered across different geographical locations. Despite being integral to the company's operations, these teams often worked in isolation, resulting in a lack of coordination that hampered efficiency and synergy.

Company internally took steps toward an improved operational model, additional challenges surfaced. Data sources were readily available, but the lack of focus led to information overload, hindering the decision-making processes. Moreover, the existing practice of relying on suppliers for information raised concerns about potential bias and inaccuracies.

Additionally, cost models were developed on Excel sheets, leading to fragmented information and lack of a single source of truth. This proved particularly problematic in the face of recent market volatility, which



Example of holistic category management solution (Illustrative)

affected multiple cost drivers and thwarted the group's ability to accurately determine current-day prices.

Through these trials, it became increasingly clear that a more robust and coordinated strategy was essential for overcoming these obstacles. The company's commitment to refining its approach — coupled with an understanding of the critical importance of clear, unbiased information and effective cost estimation — set the stage for significant transformation.

Outcome

- The company adopted a single platform for its category management needs which showcased detailed cost insights in one place
- The timing of multiple sourcing events was changed based on opportunities and market softness in the categories. Supplier audits were conducted keeping in mind risks identified by external research
- The real-time cost view ensured the company was never blindsided by any significant external market movement. This also helped in more accurate budgeting

Conclusion

In these times, procurement functions that don't keep up with the fast-paced changes in category management will run the risk of falling behind. With new and constantly evolving factors coming into play, it's becoming

increasingly important to prioritize monitoring of different categories.

As procurement undergoes a transformation from a tactical to a strategic business function, the performance of CPOs and other senior procurement leaders is being assessed based on the strategic value their teams bring to the overall success of the organization. To achieve this, procurement leaders need to have the right set of tools to push the levers of profitability. Procurement should investigate technological enablers that help with this objective, which are beginning to emerge in the market.

The bottom line. Increased visibility of supplier performance & changing market dynamics and the ability to respond to those is the general "punch list" for any effective and dependable category management solution. ■

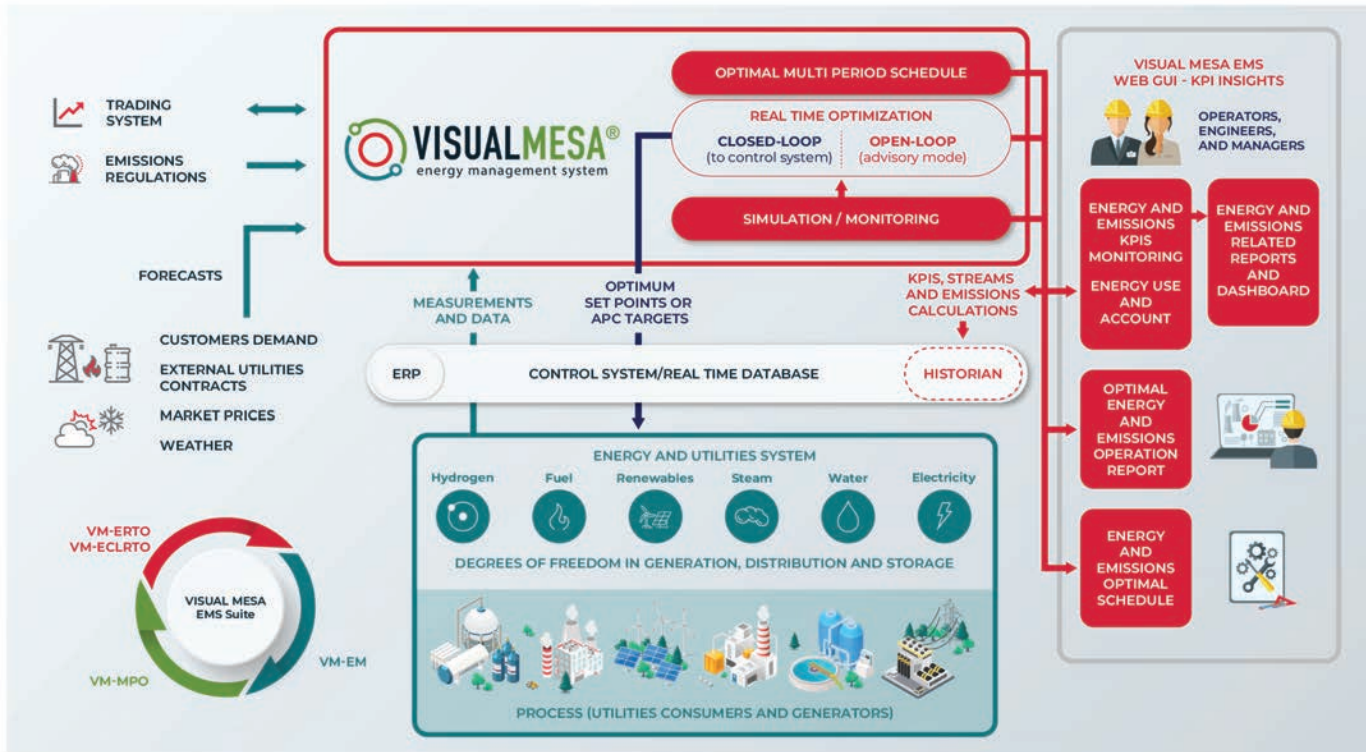


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Senior Research Analyst Market Intelligence
GEP Worldwide

KBC Launches Visual MESA Greenhouse Gas Emissions Management Software



The figure above shows the overall Visual MESA EMS Applications working and interacting together

KBC (A Yokogawa Company) announces the launch of a revolutionary emissions management solution, Visual MESA® Greenhouse Gas Emissions Management for industrial process plants. Whether cloud-based or on-site, this technology integrates the emission management workflow across the entire plant to simplify reporting and reduce Scopes 1 and 2 emissions.

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<https://www.kbc.global/energy-transition/technology/visual-mesa-energy-management-system/>

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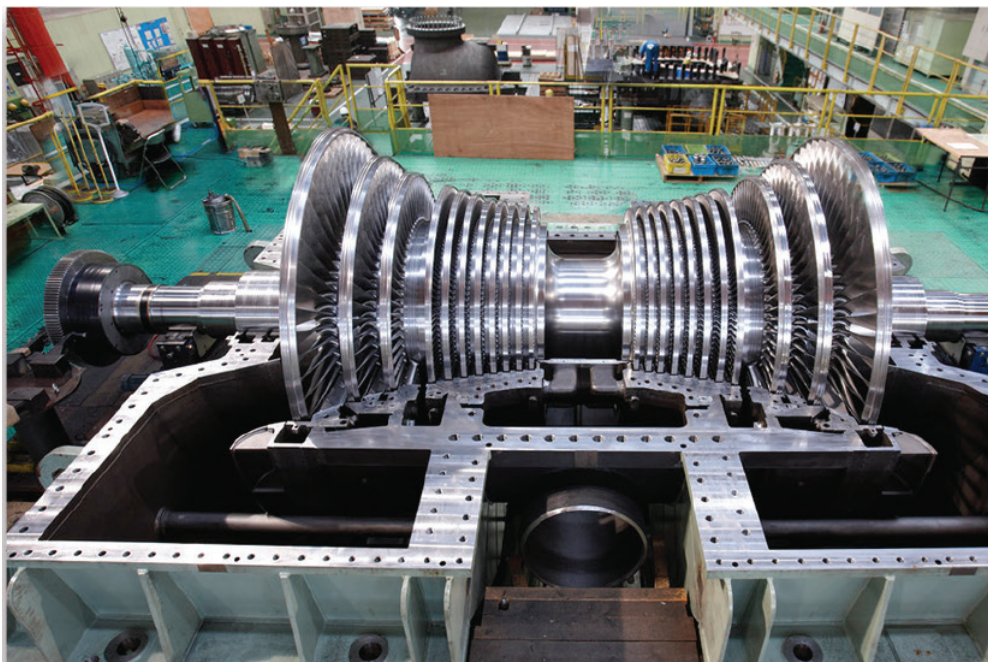
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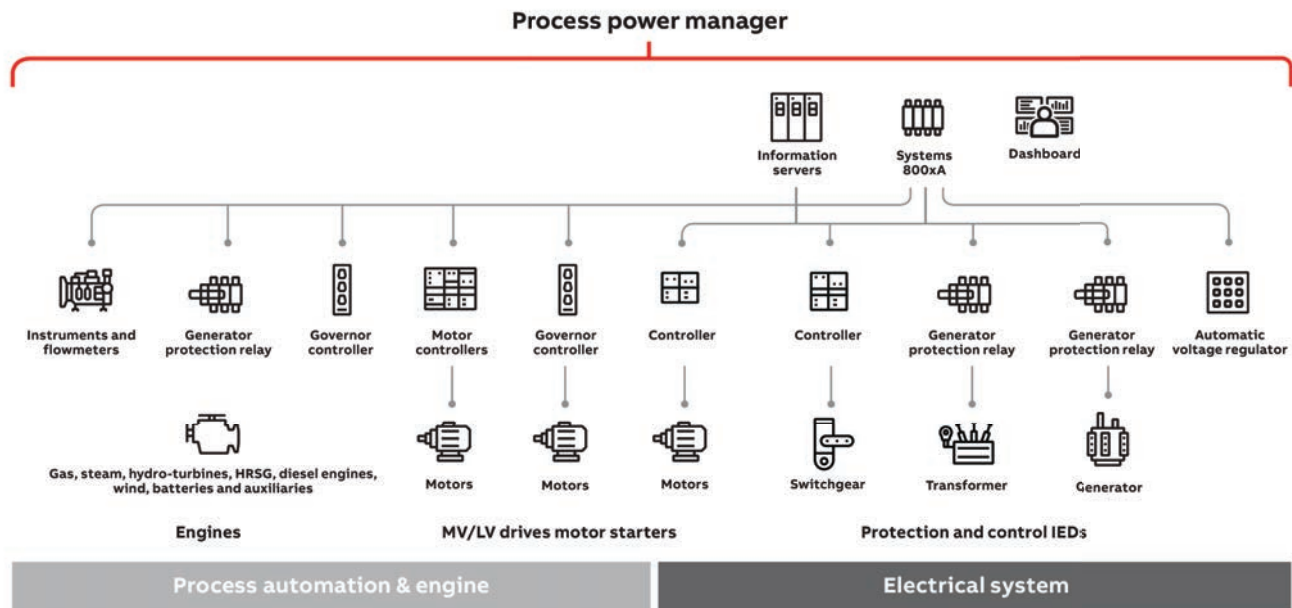
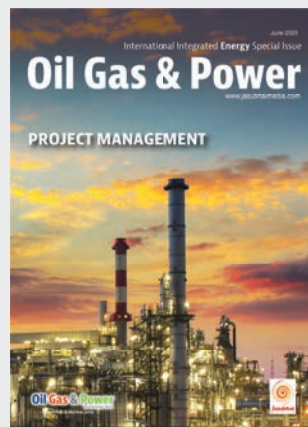
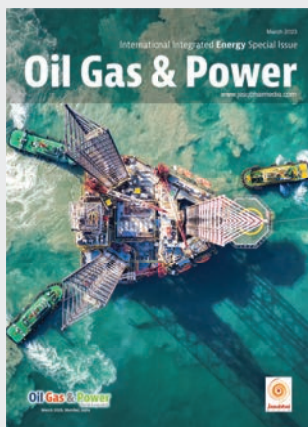


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