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NEWS

Hardeep Puri inaugurates floating re-fueling CNG station for boats at Ravidas Ghat

New Delhi, India: Minister of Petroleum and Natural Gas & Housing and Urban Affairs Hardeep Singh Puri has approved the city's second floating Compressed Natural Gas (CNG) Mobile Refueling Unit (MRU) station at Ravidas Ghat, Varansai. Both the stations have been developed by GAIL (India) Limited, a Maharatna PSU under the Ministry of Petroleum & Natural Gas. GAIL Chairman & Managing Director Shri Sandeep Kumar Gupta, Director (Human Resources) Ayush Gupta, Director (Marketing) Sanjay Kumar and a host of dignitaries were present on the occasion. With this,

floating CNG stations for boats are now operational on both sides of the main Ghats of Varanasi. The floating stations have been developed by GAIL at a cost of approx. ₹ 17.5 crore.

In a world grappling with environmental challenges and the urgent need to transition to cleaner, more sustainable energy sources, the inauguration of the second floating infrastructure in Varanasi is a significant step towards viable sustainable energy solutions, Puri said. "The decision to set-up this floating CNG station is a testament to our belief in the transformative power of clean energy," the Minister said.

Speaking about the significance of CNG station at Ravidas Ghat, Puri noted that this will provide great convenience to boatmen as they will not have to go all the way to NaMo Ghat for refueling, thus saving time and money. "On an average, it is estimated that each boatman can potentially save over ₹36,000 per year by using CNG as fuel", said the Minister.

For many years, the boatmen at Varanasi Ghats have been using old and less efficient petrol and diesel engines which are now being replaced by new CNG engines along with kits leading to improved fuel efficiency. Under its Corporate Social Responsibility (CSR) initiative, GAIL has entered into an agreement with Varanasi Nagar Nigam (VNN) for conversion of boats to the environment-friendly fuel CNG.

Tata Steel appoints Akshay Khullar as VP-Engineering and Projects

In a strategic move to ensure seamless succession, Tata Steel appointed **Akshay Khullar** as the Vice President – Engineering & Projects (Designate). Khullar's expertise will be instrumental in spearheading the company's engineering and project initiatives. He will assume the full-time role of Vice President – Engineering & Projects on February 1, 2024.

Tata Steel has announced significant changes to its senior management team, effective December 1, 2023. Peeyush Gupta, currently serving as Vice President – Group Strategic Procurement and Supply Chain, has been re-designated as the Vice President – TQM, group strategic procurement and supply chain. This move underscores the company's commitment to Total Quality Management (TQM) as a cornerstone of its operations.

The company also acknowledges the long-standing contributions of Avneesh Gupta, Vice President – TQM and Engineering & Projects. Gupta, who has dedicated over 37 years to Tata Steel, will superannuate from his position on February 1, 2024. His retirement marks a significant milestone in the company's history.

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NEWS

Union Power & NRE Minister emphasizes upon the need for Developed countries to reduce their carbon dioxide emissions first

New Delhi, India: The Union Minister for Power and New & Renewable Energy Shri R. K. Singh inaugurated a Power Pavilion set up by the Ministry of Power, Government of India at the ongoing India International Trade Fair 2023, at Pragati Maidan, New Delhi. The pavilion aims to present the key initiatives in the power sector before the domestic and international industry and to also improve public awareness and participation in the schemes and policies of the government. Policy initiatives and themes highlighted at the pavilion include National Green Hydrogen Mission, Carbon Capture Technology, One Sun-One World-One Grid, Universal Energy Access through Renewable Energy, Electricity (Rights of Consumers) Rules, Smart Energy (Smart Grid, Smart Meter), Pumped Hydro Storage as a pathway to Grid Stability, Energy Transition, Charging Infrastructure and e-Mobility. The pavilion employs working models, interactive panels, game zones and uses latest technology for presenting to visitors the information about the power sector in a lively and engaging manner.

The Union Minister emphasized that India is not going to make any compromise on the electricity needs for a growing economy. "We need to develop. At the same time, we will do that responsibly. We were nine years ahead in achieving the Nationally Determined Contributions (NDC) target of having 40% of installed power capacity from non-fossil-fuel sources by 2030. We pledged at COP-21 in 2015, that we will reduce our emissions intensity by 33% by 2030; we did this by 2019. So, in Glasgow, we have said that by 2030, we will have 50% of our capacity coming from renewables and that we will reduce our emission intensity by 45%. We will achieve it. So, we are on target," R. K. Singh said.

GAIL's Rajeev Kumar Singhal takes charge as Director of Business Development

State-run GAIL announced that **Rajeev Kumar Singhal**, who spearheaded the acquisition of insolvent JBF Petrochemical through NCLT, has assumed the charge of Director of Business Development.

Singhal, who joined GAIL in 1989 as an assistant executive engineer, has spent more than three decades in various roles at the country's largest gas utility. An electronics and Communication engineer from IIT BHU Varanasi, Singhal, also has a Diploma in Business and Finance from ICFAI.

Some of his notable achievements include marketing US LNG to six fertiliser plants under a long-term contract, renegotiating LNG sourcing contracts from Qatar and Russia, setting up India's first smallscale liquefied natural gas (LNG) project, and acquiring a 26 per cent stake in Japonica, an LNG vessel company.

Singhal has gained extensive exposure in operating and maintaining natural gas installations, SCADA/ Telecom, LNG sourcing, trading, shipping, marketing, and business development activities covering mergers and acquisitions, diversification, renewables/green hydrogen, etc.

The Union Minister emphasized that India is not going to make any compromise on the electricity needs for a growing economy. "We need to develop. At the same time, we will do that responsibly. We were nine years ahead in achieving the Nationally Determined Contributions (NDC) target of having 40% of installed power capacity from non-fossil-fuel sources by 2030. We pledged at COP-21 in 2015, that we will reduce our emissions intensity by 33% by 2030; we did this by 2019. So, in Glasgow, we have said that by 2030, we will have 50% of our capacity coming from renewables and that we will reduce our emission intensity by 45%. We will achieve it. So, we are on target," Shri R. K. Singh said.

BASF increases defoamer capacity at its Dilovasi plant in Turkey

Ludwigshafen, Germany: BASF, a global leader in the supply of additives to the coatings industry, has announced the expansion of defoamer capacity at its Dilovasi plant in Turkey. The new production line increases the company's capacity on site, allowing a better response to rising demand for high-performance Foamaster[®] and Foamstar[®] products in South-East Europe, the Middle East and Africa. By increasing its production capacity significantly, BASF will improve its service to customers in the region and reduce lead times to ensure faster delivery.

The new production line also helps BASF to cut emissions related to transportation of the products by significantly reducing distances. The Dilovasi plant in Turkey plays an important role in BASF's additives business, serving as a key supply point for Dispex AA products, including defoamers. The recent expansion of the polyacrylic-dispersing-agent line and the now enlarged defoamer capacity further strengthen the plant's role in BASF's additives business.

"The additional capacity in Dilovasi enables us to support the growth plans of our customers in the region and improve our service level," explained Joachim Burger, Head of Sales Additives EMEA.

Defoamers are essential in the production of paints, coatings and inks since they prevent not only foaming but also, as a result, defect formation. BASF's Foamaster[®] and Foamstar[®] products are well-known for their high performance in defoaming applications.

Godrej & Boyce continues to shape responsible choices

Mumbai, India: Godrej & Boyce, the flagship company of the Godrej Group, announced its transformative Sustainability targets for 2032. Rooted in a vision where profitability aligns seamlessly with conservation, the company aims to spearhead responsible choices for all Indians, setting a groundbreaking goal to derive 50% of its revenues from its Good & Green product portfolio within the next decade.

Jamshyd N Godrej, Chairman and Managing Director of Godrej & Boyce, underscored the unparalleled

K Shanmugha Sundaram takes charge as Director (Projects) of NTPC

K. Shanmugha Sundaram has taken charge as Director (Projects), NTPC on 1st December, 2023. He belongs to 1988 batch Electronics and Communication Engineering graduate from Govt. College of Technology, Coimbatore with PGDM from MDI Gurgaon in the area of Strategy & Finance. Prior to joining as Director (Projects), NTPC Limited, he was ED to CMD, NTPC Limited

K. Shanmugha Sundaram joined NTPC Limited as Graduate Engineer Trainee officer in 1988 and has more than 35 years of diverse and versatile experience in Project as well as Commissioning stages of 110, 210, 500, 660 and 800 MW fleets, greenfield as well as brownfield, across various states in India. He also has experience of operating and

maintaining vast fleet of power stations. K. Shanmugha Sundaram was actively involved for the development of 1st supercritical power project of India at Sipat. He has worked in various capacities at NTPC Darlipali Project.

He has exposure of working at Corporate Centre in Operation Services department wherein monitoring of Company's functions is being carried out and strategic initiatives taken.

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Plot # 237, GIDC, Umbergaon, Dist. Valsad, Gujarat – 396171, India Tel: +91-260-2562013, Email: works@dynamicforge.com economic opportunity that sustainability presents. He said, "Our vision isn't merely about growth but about sustainable progress in harmony with our planet, driven by meaningful collaborations at all levels. In the last decade, we have achieved some critical milestones in our sustainable journey and have taken an equivalent stretch for the decade ahead. From moving towards a wholly green supply chain, improving our skilling programs to increase employability to generating atleast 50% of our revenues from Good & Green products, we are scaling up our sustainability targets, demonstrating our firm commitment to climate action and societal development"

Godrej & Boyce has further fortified its criteria for Good & Green products, emphasizing stringent environmental and social parameters. Green products champion resource efficiency, low carbon emissions, recyclability, and the use of sustainable materials while eschewing toxic substances. Simultaneously, Good products align with Sustainable Development Goals (SDGs), championing vulnerable communities and supporting national programs in crucial areas such as infrastructure, clean energy, and resource safety.

ONGC to cut gas flaring: Chairman Arun Kumar Singh

Mumbai, India: India's leading oil and gas company, ONGC, has unveiled its goal of becoming net-zero by 2038, according to Chairman Arun Kumar Singh. The company will prioritize round-the-clock renewable energy sources like solar power, green ammonia, and offshore wind farms.

The company aims to significantly increase its renewable energy generation capacity from the current 189 MW to 1 GW by 2030. ONGC also plans to invest ₹ 2 lakh crore on clean energy projects to meet its 2038 netzero carbon emissions goal. Expressing confidence in achieving net-zero emissions for Scope-1 and Scope-2 by 2038, ONGC Chairman & CEO Arun Kumar Singh stated, "We have conducted thorough internal analysis and are now confident in achieving this ambitious goal." This significant investment in green energy projects paves the way for a cleaner future and reinforces India's growing commitment to renewable energy sources.

PCBL to acquire Aquapharm Chemicals for ₹ 3,800 crore

Pune, India: Philips Carbon Black has approved the acquisition, directly or through one of its affiliates, of 212,172 shares of Aquapharm Chemicals Private Limited ("ACPL"), for aggregate consideration of ₹ 3,800 crores (subject to agreed adjustments) representing 100% of the issued and paid-up share capital (on a fully diluted basis) of ACPL ("Proposed Transaction")

The Proposed Transaction shall be financed through a mix of internal accruals and external fund raise by the Company and/or its affiliates/associates. This acquisition of ACPL marks Company's foray into global specialty segments of Water treatment Chemicals and Oil & Gas Chemicals and it is the first milestone in achieving the vision of creating a multi-platform global specialty chemical business portfolio.

The Proposed Transaction is subject to approval from the Competition Commission of India and other customary related filings and approvals. This acquisition of ACPL marks Company's foray into global specialty segments of Water treatment Chemicals and Oil & Gas Chemicals and it is the first milestone in achieving the vision of creating a multi-platform global specialty chemical business portfolio.

Diamines and Chemicals to ramp up production capacity of synthetic organic chemicals

Vadodara, India: Diamines and Chemicals Limited announced that the Company has received a letter for proposed Expansion of Synthetic Organic Chemicals in existing manufacturing unit of M/s. Diamines and Chemicals Limited at plot No. 13, PCC Area, P.O. Petrochemicals, Vadodara from Gujarat Pollution Control Board (GPCB). Consolidated Consent & Authorization (CC&A) for setting up Proposed Expansion of Synthetic Organic Chemicals in existing manufacturing unit of M/s. Diamines and Chemicals Limited.

Diamines and Chemicals Ltd. was incorporated in the year 1976 and commenced its production in 1982. The company has been the sole manufacturer of Ethyleneamines in Indian subcontinent for more than two decades. This plant has been set up with total indigenous R&D and expertise and is placed among the select band of 6 to 8 companies worldwide who have proprietary technology for the manufacturing of Ethyleneamines.

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Gujarat CM approves FD0D0 compressed natural gas scheme

Gujarat, India: Gujarat Chief Minister Bhupendra Patel has approved the full dealer-owned dealer-operated (FDODO) compressed natural gas (CNG) scheme, which will be implemented by Gujarat Gas (GGL) and Sabarmati Gas (SGL). This move comes in the wake of state government's approach to developing CNG stations through the public-private partnership (PPP) model is to promote green mobility and a clean environment. The government maintains that the selection for this scheme will be completely based on a transparent selection process. As per the GGL and SGL's specifications, the dealer will be fully responsible for securing permission regarding the land and the documents for setting up the CNG station under this scheme, the station setup, mechanical or electrical work of construction will also have to be done by the dealer in the CNG station.

Govt asks coal block owners to take necessary steps to operationalise mines into operation

New Delhi, India: The Government asked coal block owners to take steps to operationalise mines that are at an advanced stage of commissioning. In FY'24, India might produce 145 Million Tonnes (MT) of coal from commercial and captive blocks, that would help bring down the country's import of fossil fuel.

M Nagaraju, Additional Secretary and Nominated Authority, Ministry of Coal, chaired a review meeting of producing and expected to produce captive and commercial coal mines during 2023-24. During the meeting, Nagaraju asked the companies allotted coal blocks to take necessary steps to achieve production target of the current fiscal.

"The total coal production from captive/commercial coal mines during April 1, 2023 to November 20, 2023 was around 80 MT, indicating a year-on-year growth of 23 per cent from the same period of FY 2022-23," the coal ministry said in a statement.

Rolls-Royce, Topsoe, and ULC-Energy strike agreement to investigate nuclear-enabled hydrogen production

Amsterdam, Netherland: ULC-Energy has signed an agreement with Topsoe and Rolls-Royce SMR to jointly investigate the production of hydrogen using Topsoe's Solid Oxide Electrolysis Cell (SOEC) technology and both electricity and heat produced from a Rolls-Royce SMR nuclear power plant.

Furthermore, the Rolls-Royce SMR nuclear power plant can, when required, switch to deliver power to the grid, providing back-up to variable power sources when these sources are not available. This is expected to be a competitive solution compared to alternatives, like long duration energy storage solutions or hydrogen combustion for electricity generation.

The joint investigation will include a valuation of the operational flexibility of the Rolls-Royce SMR/Topsoe SOEC combination in the future green energy market.

"Hydrogen will play an increasingly important role in balancing future energy markets. We expect nuclear energy, especially in combination with high temperature electrolysis, to be able to produce zeroemission hydrogen competitively on a stand-alone basis. Additional value associated with the operational flexibility will further enhance the business case for this solution. We are particularly pleased that this study has been made possible by the support from a number of national and international companies" said Dirk Rabelink, CEO of ULC-Energy.

"At Topsoe we are excited to be part of this study demonstrating the synergy between Topsoe's SOEC technology and nuclear. SOEC is a modular design that leverages high-temperature electrolysis that enables industrial-scale production of clean hydrogen using clean energy. Due to the nature of the intrinsic fastreaction kinetics and optimized conductivity found in high-temperature electrolysis,

Topsoe's SOEC technology produces more hydrogen per total power input when compared to the alternatives

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NEWS

of alkaline and PEM electrolysis. Additionally, when coupled with a heat-producing technology such as nuclear, SOEC allows for the lowest levelized hydrogen cost with the highest level of energy efficiency", Jack H. Carstensen, Business Development Director, Topsoe.

Clariant's SynDane catalyst chosen for Shenghong's new world-scale biodegradable plastics project

Munich, Germany: Clariant, a sustainability-focused specialty chemical company, announced that it has been awarded a major contract by Jiangsu Shenghong Petrochemical Co., Ltd, to use Clariant's SynDane 3142 LA catalyst for its new maleic anhydride (MA) production plant in Lianyungang, Jiangsu province, China. With a production capacity of 200,000 tons per year, the new plant slated for start of production in 2025, will be one of the largest production plants for MA worldwide.

The plant in Lianyungang will produce maleic anhydride as an intermediate product for polybutylene adipate terephthalate (PBAT), which in turn will function as a base product for biodegradable plastic. Using the SynDane catalyst, Shenghong Petrochemical will be able to improve production efficiency and reduce power consumption, leading to annual energy savings of up to 24 million CNY.

Xaver Karsunke, Head of Clariant Specialty Catalysts, commented: "Sustainability is at the heart of our company strategy to drive change by partnering with our customers to develop sustainable, efficient solutions. We are excited to support Shenghong in this ambitious and important project to address the plastic waste problem and maximize their energy savings during MA production with our innovative SynDane catalyst." With its unique shape design, SynDane 3142 LA reduces the pressure drop by 30%-35% and thereby significantly lowers compressor energy consumption.

Fertiglobe ships world's first ISCC Plus certified renewable ammonia

Abu Dhabi, UAE: Fertiglobe, the strategic partnership between ADNOC and OCI Global announced that it has completed the first shipment of the world's first internationally recognized renewable ammonia with ISCC PLUS (International Sustainability and Carbon Certification) certification. The renewable ammonia was produced at the company's facilities in Egypt using renewable hydrogen from its pilot Egypt Green Hydrogen electrolyzer and will go into the production of near-zero emissions synthetic soda ash – a key ingredient in laundry powder – for Unilever.

This world-first shipment, facilitated by OCI Global, demonstrates Fertiglobe's commitment to decarbonizing industries, delivering on its sustainability agenda and supporting the global energy transition. The shipment was sent to Tuticorin Alkali Chemicals and Fertilisers Limited (TFL) who will produce the soda ash for Unilever's India business, Hindustan Unilever (HUL).

Ahmed El-Hoshy, CEO of Fertiglobe and OCI Global, commented: "This shipment is an important milestone for Fertiglobe, a breakthrough in producing and supplying renewable ammonia to the world, and for the ongoing execution of our hydrogen roadmap. As a pioneer in renewable ammonia, we see immense potential in its ability to decarbonize industries and drive the global energy transition. Looking ahead, we are committed to leveraging our state-of-the-art ammonia facilities and global distribution infrastructure to expand our low-carbon ammonia capacity to meet growing demand and further reduce the carbon footprint of our business."

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Fertiglobe is pursuing several sustainability projects, notably the Egypt Green Hydrogen project in partnership with Scatec, Orascom Construction, the Egyptian Electricity Transmission Company, and the Sovereign Fund of Egypt. Once completed, this project will have the capacity to produce up to 15,000 tons per annum (tpa) of green hydrogen, serving as feedstock for producing up to 90,000 tpa of renewable ammonia at Fertiglobe's facilities located in the Suez Canal Economic Zone in Egypt. Other Fertiglobe initiatives include the Ta'ziz 1 million tpa low-carbon ammonia project, the low-carbon ammonia pilot in the UAE at Fertil and the green hydrogen project in the UAE.

Lotte chemical develops separating coating material technology for next-generation batteries

Seol, South Korea: LOTTE Chemical announced that it developed Korea's first 'separator coating material manufacturing technology' based on polymer solid electrolyte to solve instability issues of lithium metal anodes used in next-generation semisolid/all-solidstate lithium metal batteries, and completed patent application of this. This technology is characterized by improving the durability of lithium battery materials by suppressing dendrite (phenomenon where needleshapes generate from lithium, crystallization of shapes that reduce battery activities) by coating functional materials on the lithium metal battery separator to improve the flow of lithium ions.

Through this, it is possible to secure long-term stability and durability of lithium metal anodes, and it displayed over 90% capacity conservation rate at 500 cycles, and therefore, approximately 30% or higher durability improvement effects compared to non-coated separators can be expected. Using this technology can make it possible to use manufacturing equipment applied in existing lithium-ion batteries, thus saving on investment costs when constructing next-generation semisolid/all-solid-state lithium metal battery production facilities.

Since making share investments and JDA (joint R&D agreement) with 'SOELECT', a US startup that develops lithium metal anodes in 2021, LOTTE Chemical developed and applied technologies related to semisolid/all-solid-state lithium metal batteries that are said to be 'next-generation batteries' due to its high energy density and stability compared to existing

lithium-ion batteries through about two years of joint research. LOTTE Chemical is currently conducting tests for application of the technology with domestic and overseas lithium metal battery companies and plans to additionally build cooperative relationships with specialized research institutes. By doing so, it plans to pioneer markets where lithium metal anodes can be applied and accelerate commercialization of lithium metal batteries.

Total Energies acquires stake in Xlinks Morocco-UK Power Project

Paris, Europe: TotalEnergies has invested £20 million to acquire a minority stake in Xlinks First Limited, a company founded in 2019 in the United Kingdom, joining fellow investors Octopus Energy and Abu Dhabi National Energy Company (TAQA).Xlinks plans to develop a giant renewable project in Morocco (combining solar and wind) to supply green electricity to the United Kingdom through the installation of high-voltage direct current (HDVC) subsea cables, coupled with a large battery energy storage. Upon completion, the project is expected to deliver enough renewable, reliable and affordable electricity to power over 7 million British homes.

Simon Morrish, CEO of Xlinks, said: "We are excited to welcome Europe's largest energy company to be a part of our ambitious vision to foster long distance power exchanges through this iconic partnership with the UK and Morocco. Total Energies' investment goes far beyond capital, providing a rare combination of expertise in areas that meet the unique challenges we face. This marks a highly successful end to 2023 and will give us an even greater impetus to achieve our goals as we enter 2024." Vincent Stoquart, SVP Renewables at TotalEnergies, said: "We are delighted to join the Xlinks project and its other investors to support the development of such a pioneering and ambitious endeavor. This innovative project will benefit from our track record in developing large and complex integrated energy projects."

Kemira sells its oil & gas business to Sterling Specialty Chemicals

Helsinki, Finland: Kemira has signed an agreement to divest its Oil & Gas-related portfolio to Sterling Specialty Chemicals LLC, a US subsidiary of Artek Group, a global industrial chemicals group based in

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207, Orion Business Park, Next to Cine Max, Kapurbawdi, Ghodbunder Road, Thane (W) - 400 607. INDIA. Phone: +91 22 2589 6422, 2589 6524 /25 Email : sales.thane@polyvalve.com www.polyvalve.in www.polyvalve.com India. The transaction enables Kemira to focus on its core businesses and accelerate its profitable growth strategy. Kemira and Sterling Specialty Chemicals LLC will also enter into a long-term partnership, consisting of contract manufacturing agreements in both directions.

"The divestment of the Oil & Gas business will clarify our focus on sustainability and our strategic priorities: we want to expand in water, build a leading renewables portfolio and digital services business. This move strengthens our capability to look for growth within our water treatment and Pulp & Paper businesses and also to explore new growth opportunities. With Sterling Specialty Chemicals LLC, we have found a committed owner for the Oil & Gas business enabling it to grow further. Our long-term partnership with Sterling Specialty Chemicals LLC will support the transition for our customers," says Petri Castrén, Interim President and CEO at Kemira.

"The acquisition of a high-quality Oil & Gas-related portfolio from Kemira is another step in our global vision and growth strategy of becoming a leading specialty chemicals player. We warmly welcome all new employees and are looking forward to exploring exciting future growth opportunities together with our existing oil & gas business. We are also pleased with our long-term partnership with Kemira, one of our largest customers going forward," says Vishal Goenka, Director at Artek Group. The revenue to be carved-out from Kemira was around EURO 430 million in 2022. This includes Kemira's Oil & Gas business, which had a revenue of EURO 373 million in 2022. The remaining carved-out revenue of around EURO 57 million consisted of non-Oil & Gas industrial polymer sales through indirect channels.

INEOS acquires Eastman Chemical's Texas city site for USD 490 million

Knightsbridge, London: INEOS has announced it has completed the acquisition of the Eastman Texas City site, the 600kt Acetic Acid plant and all associated third party activities, from Eastman Chemical Company. As previously announced, Eastman and INEOS have also entered into a Memorandum of Understanding to explore options for a long-term supply agreement for vinyl acetate monomer.

David Brooks, CEO INEOS Acetyls, comments "We are delighted to have completed this strategic acquisition which will help drive our global ambition for our Acetyls business. Our focus now will be on the integration of the site, business and employees into INEOS Acetyls.

The deal is targeted to close before the end of 2023, subject to regulatory approvals.

"We are happy to have reached this agreement with INEOS. They have been a strong partner with us at the Texas City site and have extensive experience and a complementary position in the acetyls space," said Erwin Dijkman, Division President, Chemical Intermediates.

"Our Texas City Operations is an attractive site with an incredible team of people, and we are pleased that INEOS plans to further invest in and grow the site. We look forward to working closely with INEOS as we prepare for a seamless transition later this year, and longer-term as operators of our plasticizer assets at the site."

CF Industries completes acquisition of Waggaman ammonia production facility

Northbrook, Illinois: CF Industries Holdings, Inc. announced that it has closed its acquisition of Incitec Pivot Limited's ammonia production complex located in Waggaman, Louisiana. Under the terms of the agreement, CF Industries purchased the Waggaman ammonia plant and related assets for USD 1.675 billion, subject to adjustments.

The companies allocated approximately USD 425 million of the purchase price to a long-term ammonia offtake agreement under which CF Industries will supply up to 200,000 tons of ammonia per year to IPL's Dyno Nobel subsidiary at production economics. CF Industries funded the remaining purchase price with cash on hand.

"We are pleased to grow our industry-leading ammonia production capabilities with the addition of IPL's Waggaman ammonia production facility and team," said Tony Will, president and chief executive officer, CF Industries Holdings, Inc. "This transaction deploys our capital efficiently, delivering immediate profitable growth by adding one of the newest ammonia production units in North America into our existing network while advancing our long-term strategic focus on low-carbon ammonia as a clean energy source."

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NEWS

Topsoe, Standard Gas collaborate on UK-based renewable natural gas and methanol project

Lyngby, Denmark: Topsoe, a global leader in carbon emission reduction technologies, stated that it has signed an MoU with Standard Gas, a decarbonization technology company, to collaborate on a UK-based project to produce renewable natural gas and methanol from residual waste feedstocks.Under the terms of the MoU, Topsoe will provide the technologies, engineering, equipment items and catalysts that will enable the synthesis gas produced by Standard Gas to be processed into valuable products such as methane and methanol.

The process of renewable natural gas production will additionally produce biochar, which captures and removes carbon and can be sequestered in valuable products for the agricultural, construction and environmental industries. Standard Gas will develop and obtain all appropriate approvals, licenses, funding and offtake agreements needed to implement the project. Standard Gas will either own and operate the potential project or license to a third-party owner.

Peter Vang Christensen, Senior Vice President, Clean Fuels & Chemical at Topsoe, said, "We are thrilled to be working with Standard Gas to address waste management, which continues to be a significant challenge to society. Standard Gas' visionary approach to waste management aligns with our own aspirations to be a global leader in carbon emission reduction technologies. This MoU marks another step forward in our shared commitment to sustainability and environmental stewardship."

Laurence Sharrock, Technical Director at Standard Gas, said,"Topsoe is a perfect partner for this project

given the company's long, successful track record in the research and development of chemical process technology, which it has licensed on a global scale. Our SG100 technology has a significant contribution to make in combatting Climate Change, achieving Net Zero, and by converting municipal waste to a valuable feedstock without gaseous carbon emissions, it also benefits the UK economy's efforts to become circular and regenerative."

Renewable power scales up as Ambuja Cements to invest ₹ 6, 000 crore by FY26

Mumbai, India: Ambuja Cements Limited, the cement and building material company of the diversified Adani Group, has unveiled a goal solidifying its position as a frontrunner in the global arena of sustainable cement production. In a monumental stride towards a greener future, the Company has committed a significant investment of ₹ 6,000 crores in renewable power projects, targeting a capacity of 1,000 MW.

This transformative investment encompasses a diverse portfolio of solar and wind power projects strategically positioned across Gujarat and Rajasthan. The lineup includes a 600 MW Solar Power project and 150 MW Wind Power project in Gujarat and a 250 MW Solar Power project in Rajasthan. This will be achieved by FY 2026 (200 MW by March'24) in addition to the existing 84 MW of Solar & Wind Power.

The investment not only demonstrates our commitment to environmental sustainability but also promises compelling economic advantages to Ambuja's planned larger capacity of 140 MPTA. With lower cost of generation from green power, the power cost will come down from \gtrless 6.46 per kWh to \gtrless 5.16 per kWh.

A reduction of ₹ 1.30 per kWh (20%), which translates into ₹ 90 PMT of cement for targeted capacity of 140 MTPA by FY 2028, accelerating the Company's ESG targets. Additionally, green power will assist in enabling an increased supply of green cement, making it possible for the user industry (infrastructure and housing) to go green.

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MissionPET-08Mission PET Revolutionizes PET Recycling with Cutting-Edge Sorting Technology

Austrian, Europe: Recycling pioneers are leading the charge towards a sustainable economy with Mission PET GmbH, a newly established company dedicated to the consistent recycling of PET. Positioned at the Zellinger Company's eco-park in Feldkirchen-Gerling, Austria, Mission PET aims for an annual capacity of 14,000 metric tons of rPET pellets, crucial for meeting the EU's plastic recycling targets. Beyond classic bottle-to-bottle applications, Mission PET's high-purity rPET material caters to various industries.

Ensuring top-tier quality, Mission PET relies on advanced sorting technology provided by Sesotec. Their state-ofthe-art sorting system, FLAKE PURIFIER+, became operational in March 2023, boasting precision in material sorting. Sesotec not only supplied the sorting system but also orchestrated the entire infrastructure, including steel structures, silos, and control systems. The FLAKE PURIFIER+ system excels in decontaminating and cleaning PET material, ensuring the resulting pellets meet the standards of virgin material.

Markus Huemer, Managing Director of Mission PET GmbH, emphasizes the commitment to providing customers with sustainable food-grade rPET pellets. Sesotec's multisensory sorting systems play a pivotal role in achieving the best decontamination and material cleaning, reinforcing Mission PET's dedication to the circular economy mission.

Aether Industries Enters Battery Tech with Global Partnership.

Mumbai, India: Aether Industries Limited (AIL), a prominent name in India's specialty and fine chemical manufacturing sector, has recently inked a strategic agreement and commercial supply contract with a leading global lithium-ion battery producer. This collaboration signifies a pivotal move for Aether as it steps into the electrolyte additives arena, a crucial domain within the burgeoning battery space.

The agreement positions Aether as a key supplier of essential additives customized for electrolytes, promising to enhance the efficiency and performance of lithium-ion batteries. More significantly, it breaks the dependency on sourcing these critical chemicals from China, underlining AIL's commitment to fostering selfsufficiency in the realm of battery production.

Leveraging its profound expertise in core competencies such as chemistry and technology, Aether aims to play a vital role in advancing its global partner's mission of expediting the world's transition towards sustainable practices.

Aether has already made strides in developing key products like Vinylene Carbonate, Fluoroethylene Carbonate, 1,3,2-Dioxathiolan-2,2-Dioxide, 1-Propene-1,3-Sultone, and 1-Propane-1,3-Sultone—critical electrolyte additives. Internal research suggests that Aether is poised to become the first Indian manufacturer of these pivotal electrolyte additives.

This strategic move not only propels Aether Industries into the forefront of electrolyte additives but also sets the stage for the company to enter the broader battery space. Positioned to cater to global and domestic battery manufacturers, this venture aligns with Aether's vision to be a key player in the rapidly evolving and next-generation battery industry segment.

Robotics and automation expects sales growth of 4 percent in 2024

Frankfurt, Germany: The robotics and automation industry in Germany is expecting a 4% increase in turnover for 2024. According to the latest figures from the VDMA Robotics + Automation Association (VDMA R+A), industry sales will thus increase to 16.8 billion euros - a new record high.

Frank Konrad, Chairman of VDMA R+A, comments: "The positive forecast for 2024 shows that robotics and automation will remain on course for growth despite an environment characterized by considerable uncertainty. Our industry plays a crucial role as a key technology in overcoming a wide range of challenges such as demographic change, the transformation to climate neutrality and the strengthening of resilience and competitiveness. We are optimistic that the innovative strength of our member companies will help us to successfully overcome these challenges." ■

PROJECT UPDATES

IOCL's Board approves revised outlay for Panipat refinery expansion

Panipat, India: Indian Oil Corporation Limited (IOCL) stated that its Board of Directors has approved revised outlay for a significant expansion project at its Panipat refinery in Haryana, India. The project, which is valued at ₹36,225 crore (USD 4.9 billion), aims to increase the refinery's crude processing capacity to 25 MTPA from 15 million tonnes per annum (MTPA).

The project is expected to be completed by December 2025 and will involve construction of new refining units, revamping of existing units, and installation of new infrastructure. The expansion is expected to increase IOCL's margins and de-risk its exposure to its conventional fuel business.

Dow approves USD 6.5 billion investment for Path2Zero project in Canada

Munich, Germany: Dow announced that its board of directors has declared final Investment Decision on the Company's Fort Saskatchewan Path2Zero investment to build the world's first net-zeroi Scope 1 and 2 emissions integrated ethylene cracker and derivatives facility in Alberta, Canada. The USD 6.5 billion project, excluding governmental incentives and subsidies, includes building a new ethylene cracker and increasing polyethylene capacity by 2 million MTA as well as retrofitting the site's existing cracker to net-zero Scope 1 and 2 emissions. The investment is expected to deliver USD 1 billion of EBITDA growth per year at full run rates over the economic cycle while decarbonizing 20% of Dow's global ethylene capacity.

This new capacity will enable Dow to capture growing customer demand in high-value markets, such as packaging, infrastructure and hygiene, among others, with potential additional value captured from commercializing low and zero-emissions products. The project builds on Dow's expertise in successfully implementing large projects, such as its TX-9 cracker in Freeport, Texas, which has delivered more than 15% return on invested capital since its 2017 start-up through best-in-class capital intensity, conversion cost, and low emissions intensity. The board's approval enables the Company to begin construction in 2024. Capacity additions are expected to come online in phases, with the first phase starting up in 2027, adding approximately 1,285 KTAiv of ethylene and polyethylene capacity, and the second phase starting up in 2029, adding an additional approximately 600 KTA of capacity.

To achieve net-zero Scope 1 and 2 emissions, the Fort Saskatchewan Path2Zero project will deploy Linde's air separation and autothermal reformer technology to convert the site's cracker off-gas to hydrogen, which will be used as a clean fuel to supply the site's furnaces. In addition, carbon dioxide emissions will be captured and stored, reducing existing emissions by approximately 1 million MTA of CO2e while abating all emissions from the addition of the site's new capacity.

Kerala Invests in Green Hydrogen Future

Kerala, India: Kerala has allocated ₹ 90 crore for the first phase of its green hydrogen valley project and over ₹ 12,400 crore for its green transport corridor project. The state aims to be 100% green hydrogen and green ammonia consuming by 2040.

This budget will be used for setting up three hydrogen valley platforms and distributed among the entire hydrogen value chain. The state is also planning to develop two green hydrogen valleys in Kochi and Thiruvananthapuram.

UltraTech Cement to expand cement production capacity in domestic market

Mumbai, India: The Board of Directors of UltraTech, considered Kesoram's proposal and approved a Scheme of Arrangement amongst Kesoram, the Company and their respective shareholders and creditors. ("Scheme"). In terms of the Scheme, Kesoram will demerge its Cement Business into UltraTech. The Cement Business of Kesoram consists of 2 integrated cement units at Sedam (Karnataka) and Basantnagar (Telangana) with a total capacity of 10.75 mtpa. Out of this total capacity, 8.50 mtpa is clinker backed and 2.25 mtpa is surplus grinding capacity.

The cement business also has a 0.66 mtpa packing plantin Solapur, Maharashtra. The transaction will

PROJECT UPDATES

provide UltraTech with the opportunity to extend its footprint in the highly fragmented, competitive, and fast growing Western and Southern markets in the country. Upon consummation of this Scheme of Arrangement, UltraTech's cement capacity will stand augmented to 149.14 mtpa including its overseas operations. The proposed transaction will accelerate the Company's path to achieving its stated goal of 200 mtpa cement capacity in India, reaffirming its belief in the Country's growth potential.

HPCL to commission Chhara LNG terminal in 2-3 months

New Delhi, India: Hindustan Petroleum Corporation Ltd (HPCL) is planning to begin operations at 5 million tonne a year Chhara LNG import terminal in Gujarat in the next couple of months.

The company has already received offers from 6-7 parties to hire capacity. The terminal was mechanically completed in March, but its commissioning was delayed as a 40-km pipeline connecting it to an existing network meant for sales to consumers was not yet ready. "We will commission the LNG terminal in the next couple of months," HPCL Director (Marketing) Amit Garg said.

The company was looking to lease capacity of 3 million tonne per year to other companies for a period of more than 10 years.

SJVN's 60 MW Naitwar Mori hydroelectric project in Uttarkashi is now fully operational

Shimla, India: Miniratna PSU SJVN Limited has made its 60 MW Naitwar Mori hydroelectric project in Uttarkashi, Uttarakhand, fully commercially operational as the second unit of the project with a capacity of 30 MW began supplying electricity to the national power grid. "Company has successfully synchronised the Second Unit of 60 MW Naitwar Mori Hydro Electric Project (NMHEP) with the National Grid," SJVN said in a regulatory filing to the stock exchanges this month.

SJVN's Naitwar Mori hydroelectric project will supply 12% power to Uttarakhand Naitwar Mori hydroelectric project is a run-of-the-river project with two generating units of 30 MW each. The first unit had started generating power commercially recently in November, it added. It is located on River Tons, a major tributary of Yamuna in Uttarkashi district of Uttarakhand.

The project will generate 265.5 million units of electricity

annually. The company has constructed a 37-km 220 KV transmission line for the evacuation of power from Naitwar Mori HEP -- from Bainol to Snail. After the commissioning of the project, 12 percent free electricity will be supplied to Uttarakhand as royalty. In addition, each project-affected family will be provided with an amount equivalent to the cost of 100 units of electricity per month for ten years.

The project will usher in an era of overall development of the area, with infrastructure development and generation of direct and indirect employment. Treading on the path of impeccable progress, the company, a leading power CPSU, is dedicated to contributing to the energy goals of the central government," said SJVN. It has set a target of achieving installed capacity of 12,000 MW by 2026 and 50,000 MW by 2040.

Odisha Govt approves projects worth ₹ 4, 804 crore

New Delhi, India: Odisha's industrial engine is roaring! The state government approved 19 diverse projects worth a whopping ₹ 4,804 crore, promising to spark a 17,553-job bonanza across 10 districts. From textiles and steel to chemicals, food, and IT, these investments showcase Odisha's manufacturing muscle, rich mineral resources, and commitment to tech advancements. Welspun Living's ₹ 200 crore textile facility and Tata Steel's ₹ 735 crore service center lead the charge, creating thousands of jobs. Other highlights include Rungta Paints' ₹ 991 crore manufacturing unit and Summa Real Media's ₹ 226 crore IT complex, further fueling the state's economic engine. This comprehensive development push extends to renewable energy with GAIA Neo Energy's ₹ 87 crore biogas plant. With infrastructure and skilled workforce development on the horizon, Odisha is poised for an industrial boom, one project at a time.

India's Europe Plus Strategy: Balancing Short-Term Gains with Long-Term Sustainability

The world's economic map is being redrawn, with Europe's energy crisis pushing manufacturers eastwards. India, with its vast potential and competitive edge, emerges as a prime candidate for this industrial exodus. But amidst the promise of short-term gains lies a hidden danger: the risk of becoming a dumping ground for outdated, polluting technologies. **Raj Tanna, Managing Director, SCHUTZEN Care Private Limited** delves into the complexities exploring how factors like infrastructure, technology transfer, and environmental concerns could shape the future of India's Chemical Industries

Raj Tanna Managing Director SCHUTZEN Care Private Limited

How do you anticipate the Europe Plus strategy to pan out, and how are you preparing to address this opportunity?

From the country's perspective, the Europe Plus strategy presents an appealing option for Europe that addresses a temporary energy problem with several challenges that may impact India's long-term growth targets.

While India's Europe Plus strategy is driven by low labor and energy costs, the Indian factor markets, including power cuts, labor quality, road infrastructure, and connectivity to renewable grids, add to the cost of manufacturing in India and could be a significant hurdle. A crucial question that shouldn't be ignored is the nature of the investments proposed through the Europe Plus model. European manufacturers are divesting from outdated, energy-intensive, high-carbon industries that lack technological edge, which lowers their Internal Rate of Returns (IRR). At the same time, they are investing substantial capital into low-energy, low-carbon transitional technological research and manufacturing, which may not be transferred to India. This means manufacturing setups in India may produce obsolete high-carbon, high-energy technologies, while Europe re-industrializes with low-impact, low-energy technologies.

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European manufacturers will anticipate minimal reduction in Top-Lines, driven by local consumption and in developing countries, simultaneously high bottom line coverage driven from sales of new low carbon technologies to environmentally conscious markets from Europe.

This approach assists them in meeting aggressive climate targets set-out in the Green Deal & recent COP28, India has already established a strong renewable energy grid in many regions & needs to speed up efforts of connectivity and build a Life Cycle Assessment (LCA) database to quantify Scope 2 & Scope 3 reduction targets. Europe Plus one strategy serves well to India's short term targets, but there is a potential long term risk. As Indian investments mature & scale up. We would have already doubled down investments on unsustainable high carbon technologies, which would be very dificult to divest from leading to a similar reality that we see in China, which could result in large obsolete investment in old infrastructures with no demand and high pressure on CO2e reductions.

From my perspective, the European Union is technology transitioning and has proactively build several new regulations on import of goods, restricted more chemistries through REACH building barriers to entry to the European market and will maintain its technological prowess, This means Europe will continue to be a net exporter of new and profitable technologies continuing to influence global standards on safety and compliance.

It is also possible that several new European technology investments could also move to Eastern Europe, the UAE & even USA which have more favorable factor markets, ease of access and government policies supporting sustainable products and chemistries.

To ensure a sustainable growth story in India, Indian manufacturers, especially the textile industry the second largest polluter & the second largest industry in the country. The industry needs to shift focus on research and innovate for more sustainable textile products.

Implementing the SDGs presents a USD12 trillion business case, and SCHUTZEN already covers 11/17

SDG goals. So, we welcome the Europe Plus strategy and see great synergies that could be forged with European manufacturers and with our world-leading technologies. We are intensely dedicated to innovation in bio-based and biodegradable chemistries, launching globally leading technologies.

Please share insights into the roadmap for Decarbonisation and the steps your organization is taking in this direction

Granting open access to every market with negligible barriers to entry and competition, provided one can demonstrate a solution for climate change.

In 2019, SCHUTZEN made a bold commitment and completely discontinued all products based on Fossil C-12 Isotope Chemistries. Our resolve with continuous and aggressive investments in Research & development has enabled us to develop several globally leading quantified and high performance world class chemistries. Today, we are leading with sustainable bio-based chemistries and intend to maintain our leadership. Our focus is not only to decarbonise the industry but also provide a singular solution to the trinity of problems in the Chemicals industry i.e. Decarbonisation, Elimination of Effluents & Toxicity and ensuring high biodegradability.

Now, SCHUTZEN offers a complete range of biobased, biodegradable, bio-diverse nontoxic chemicals which can be used to replace obsolete Fossil Carbon based chemistries which are known to be carcinogenic and non- biodegradable. For example, If 25 Million MT of Cotton was to be Bleached and softened with SCHUTZEN's technology, we could mitigate 5.9 Billion Metric Tons of CO₂e.

In your view, what will be the implications of slowdown in China's economy as most of the capacities are operating at less than 50% utilization? What will your strategy be to tackle this eventuality?

China's technology political infrastructure, Labour and Human capital are old and declining and they are heavily invested in large capacities which are unsustainable with no demand from key buyers and increasing pressure on CO₂e reductions, It would

be quite dificult for Chinese manufactures to justify their return on Capital Employed (ROCE) leading to potential de-growth, debt servicing challenges and quality constraints.

SCHUTZEN's bio-based technology is largely indigenous and independent of China, in fact it offers us a great opportunity to replace Chinese goods but at the same time introduce low carbon, climate positive technologies to the world with a higher adoption rate which were dificult to replace earlier due to low price penetrating strategies from Chinese suppliers.

In the backdrop of current slowdown in the global market, do you expect to start investing in new capacities in the next 2-3 years?

The Bio-based material market is expected to grow at 24-25% CAGR, while the entire bio-based economy is expected to grow at 12-15% CAGR, Our technology is Quantified, Certified & Scalable. It is Carbon Neutral, CAPEX Neutral and Cost Neutral that outperforms obsolete fossil chemistries with customer adoptions and sales.

We do not see any challenges on the demand side or on the robustness of our technology. SCHUTZEN's bio-based, biodegradable, and biodiverse technology is the Best Available Technology (BAT). We plan to expand and invest in our manufacturing to scale up our production in the coming 2 years. Our challenge would be to scale up at a pace to match the demand.

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Super Systems+ and Beyond: Archroma's Blueprint for a Sustainable Fashion Future

The global textile industry is in flux, grappling with shifting supply chains, rising consumer demands, and the ever-present challenge of sustainability. In this dynamic landscape, Archroma stands out as a leader, offering innovative solutions and navigating the complexities with a keen eye on the future. We grace the opportunity to hear from **Anjani Prasad, Vice President, South Asia, Archroma Textile Effects,** who shares his insights on the industry's current state and Archroma's strategic approach.

Anjani Prasad VP, South Asia Archroma Textile Effects

How do you anticipate the Europe Plus strategy to pan out, and how are you preparing to address this opportunity?

The fashion and textile industry is amongst the world's most global diligence. It is also very complex. In the near term, we expect brands to continue to become more geographically distributed to diversify their supply chains globally. In particular, we could see more European firms considering reshoring and nearshoring production for resilience and environmental reasons.

At the same time, mills and brands are under increasing pressure to be more cost-effective while moving towards circularity and delivering the performance, longevity, and good looks that consumers demand. Amid this complexity, we see even more value in our systems-based approach to helping mills and brands navigate cost pressures, regulatory change, and shifting consumer demand. As a truly global company, Archroma provides consistent products and services worldwide, with local technical expertise in more than 42 countries.

Please share insights into the roadmap for Decarbonisation /Climate action and what are the steps your organization is taking in this direction.

At Archroma, we like to say that we touch and color people's lives every day, everywhere. This brings with it a huge responsibility. Our purpose is to lead our industry towards a more sustainable future by delivering innovative, market-leading solutions that respect the planet and enhance people's lives.

Working with customers and partners, we are at the forefront of global megatrends like the shift towards circular fashion, plastic-to-paper replacement, zero liquid discharge, and the use of natural and renewable raw materials. We actively support industry initiatives like Zero Discharge of Hazardous Chemicals (ZDHC), bluesign, and the Sustainable Chemistry for the Textile Industry (SCTI) alliance that we co-founded in 2020. In December 2022, we were awarded the EcoVadis Platinum rating for the second consecutive year, consolidating our position among the top 1% of bestrated companies in our industry.

This commitment adds value to our commercial strategy. For the coming year, we expect to make a real impact with breakthroughs like our FiberColors dyes made from pre- and post- consumer textile waste, our resource-saving DIRESUL EVOLUTION BLACK denim coloration system, and our soon-to-be launched AVITERA SE GENERATION NEXT, which gives brands and mills greater access to sustainable dyeing that is more economically viable.

Launching in December at ChromatexChem is Archroma Textile Effects' brand-new approach for our textile solutions that do well and feel good for consumers and our planet - Super Systems+.

Super Systems+ is our end-use focused, fiber specific solutions that deliver process efficiency and intelligent effects, empowering mills and brands to make the right choices, achieve their sustainability targets, and meet consumer demands. Alongside our innovations, this new approach will significantly benefit fashion and textile brands, as well as the entire industry, as we move forward towards a more sustainable future.

In your view, what will be the implications of slowdown in China's economy as most of the capacities are operating at less than 50% utilization? What will your strategy be to tackle this eventuality?

China remains an important market for Archroma. The domestic market for fashion, textiles and packaging and paper is huge and growing. Local consumers have a marked preference for local brands, especially in apparel and footwear, and issues like water scarcity, energy management and climate change matter a lot to China's people and its government.

Our priority is to help our local customers innovate to deliver higher-value products with minimal environmental impact and improved competitiveness.

In the backdrop of current slowdown in the global market, do you expect to start investing in new capacities over the next 2-3 years?

The global fashion and textile market looks likely to continue to face serious headwinds in the coming years. However, we are seeing signs of recovery in several of our key markets as brands and mills seek to harness innovation to differentiate their products, enhance sustainability and circularity, and optimize costs.

With the acquisition of the Textile Effects division of Huntsman in February 2023, Archroma's solutions portfolio expanded significantly, fortifying our innovative prowess and expertise. Our continued commitment to innovation is stronger than ever, as we continue to lead the industry towards a more sustainable future.

At our core, innovation is a crucial driver for business growth and sustainability. As new technologies redefine customer needs, our agility and innovation are paramount to meeting the demands of an intensely competitive market. As a pivotal contributor to the textile value chain, we work hand in hand with fashion and textile brand partners to address the industry's toughest challenges.

Time to be a Catalyst for Chemical Change in a Shifting World

In a global chemical landscape buffeted by economic headwinds and environmental concerns, **R. P. Gupta, Director, Bharat Rasayan Limited,** stands at the helm of a company ready to adapt and thrive. This interview delves into his insights on several crucial topics as he navigates the complex challenges and exciting possibilities facing the Indian chemical industry.

R P Gupta Director Bharat Rasayan Group

How do you anticipate the Europe Plus strategy to pan out, and how are you preparing to address this opportunity?

Unlike China Plus One, which was widely discussed around the world, Europe Plus One has majorly emerged in India lately. Faced with exorbitant natural gas prices, energy-dependent industries in Europe, such as chemical, automotive, cement, and many other industries, are facing similar problems.

In this desperate situation, European industrialists are actively exploring options for relocating their production elsewhere. Thus, coining the opportunity for other countries as 'Europe Plus One'. India's low energy, and labour costs, good infrastructure, ecosystem of skilled manpower in R&D and enhanced ease of doing business makes it a suitable alternative for some European companies to relocate production to India. The basic input materials, such as steel, power, industrial chemicals, specialty chemicals, lime, and natural resources, are available at competitive costs in India.

Bharat Rasayan Limited already has a long-term association with Agchem MNC's located in Europe

and Japan, and a lasting win-win strategy is in place for novel chemistries, which will benefit our key partners' global requirements from our Indian manufacturing operations. We foresee a major shift in this scenario, with the majority of new IP-protected molecules coming to India rather than China.

Please share insights into the roadmap for Decarbonisation /Climate action and the steps your organization is taking in this direction.

Sustainability has become an increasingly important concern for businesses worldwide, as stakeholders demand greater accountability for the environmental, social, and economic impacts of industrial activities. The chemical industry is no exception to this trend, and Indian chemical companies are now taking steps to adopt more sustainable practices.

India's chemical industry has significant importance in the country's economy. However, the industry also has significant environmental implications due to the use of toxic chemicals, water consumption, and gas emissions. Therefore, it is essential to develop a sustainability roadmap for the Indian chemical industry that will enable it to grow while minimizing

its environmental impact. Improving energy efficiency is a key priority for the Indian chemical industry, as it can reduce gas emissions and energy costs. Water conservation and management are critical for the Indian chemical industry, as water scarcity is a major issue in the country.

At Bharat Rasayan Limited, we also have a roadmap and are taking steps for decarbonisation, such as minimization of waste for incineration, third-party agreement to purchase hybrid wind-solar power, and making hazardous waste re-processed, recycled, reused, and made suitable for CO-processing. Planning of Solar electrification for building electrical systems by installing solar PV systems at admin building and warehouse as per the feasibility, Maximum use of daylights and natural ventilation in production plants and warehouses, Use of Variable Frequency Drives (VFDs) for high-HP Equipment, use of gravity-based piping and equipment layout to save pumping costs, Installation of economizer and high-efficiency burner is done in new steam boilers. Use of economizers for heat exchangers to exchange heat between process fluids as far as feasible, the greenbelt is increased with soil enrichment and denser plantation. The greenbelt trees will sequester CO2 and significantly reduce the carbon footprint of the unit.

In your view, what will be the implications of the slowdown in China's economy as most of the capacities are operating at less than 50% utilization? What will your strategy be to tackle this eventuality?

Currently, there is high dumping from China to India. In China, there have been huge capital investments and capacity enhancements. There is a huge demandsupply gap, i.e., there is less demand and a huge supply of agrochemicals. There is heavy stocking in Europe, Latin America, and the USA. So, they stopped buying and wanted to clear high inventory values in the market. This situation of demand and supply gaps would continue for approximately one year, i.e., until December 2024, thus making it a major area of concern for the global Agchem market today.

Low demand for agrochemicals in the last year and overcapacity built by major Chinese companies have created ripples in the demand-supply gap, which is here to stay for some time now. At Bharat Rasayan Limited, we are aware of the testing times ahead, and our strategy revolves around

actions related to sustainability, with more focus on R&D, contract manufacturing for key partners, the introduction of new off-patent molecules, and overseas business expansion from our current setup in the coming two years.

In the backdrop of the current slowdown in the global market, do you expect to start investing in new capacities in the next 2-3 years?

The Indian agrochemical industry is also facing major challenges due to falling prices globally following a supply deluge from China and muted demand for exports owing to destocking by global manufacturers. Operating margins have also plunged to a decadal low of 10–11 percent this fiscal due to lower volumes and realisations, impacting cash accruals for agrochemical players. Volume growth within India will be in the low single digits this fiscal year, given that inventories with domestic manufacturers are high because of lower exports.

Although one key driver of India's growth in the agrochemical sector is the backward integration of production processes. Indian companies have been investing in the production of off-patent molecules and reducing their reliance on imports from China.

Despite these challenges, the future of India's agrochemical industry looks promising. The changing agricultural landscape in the country presents new opportunities for manufacturers, formulators, and suppliers.

At Bharat Rasayan Limited, we are very optimistic that the current slowdown situation will change and there will be good demand from H1 or H2 of 2025 globally, and our investment plans are accordingly lined up to cater to the same. We have already got environment clearance for our Unit 3 in Gujarat, and capex for construction will be infused at the right time.

Pigmenting a Rosy Future: Scripting Expansion Plans and Optimism for the Indian Chemical Industry

Vipul Shah, CMD of Vipul Organics Limited, is a visionary leader navigating the shifting sands of the global chemical industry. He sees opportunity amidst Europe's woes, capitalizing on the "Europe Plus" strategy with strategic R&D and a focus on sustainable practices. His organisation champion's eco-conscious manufacturing, boasting ZLD plants and biofuel initiatives, earning him environmental accolades. In a world grappling with economic slowdown, Vipul Shah paints a picture of resilience and resourcefulness through an interview to unlock concerns and move ahead for a global scale.

Vipul P Shah Chairman & Managing Director Vipul Organics Limited.

How do you anticipate the Europe Plus strategy to pan out, and how are you preparing to address this opportunity?

Europe, especially Germany, has been a hub of manufacturing excellence and front runners in innovation in the Chemical sector especially in the Pigments/ Colorants business. Since last two years, we are seeing that the European manufacturing has taken a big hit due to various reasons such as energy crisis, increased labour cost, inflation, and overall demand slowdown in the European region. This directly brings the opportunity to India for covering up the production which used to come out of these European plants. The plants in Europe were massive in terms of the production quantities they used to produce, especially in the Pigment sector and were always known for their high quality.

We were closely following the developments and we foresaw the unique opportunity that this presents to dyes and pigments companies like us. We have been very bullish on the Europe Plus strategy and have been preparing for the same since the last two years.

Global customers who are in the business of manufacturing essentials such as food packaging, textiles, paper etc. would need to look beyond Europe for colorants for their needs and we are uniquely poised to fill that gap.

We have geared up our R&D to work on these chemistries which used to come primarily from the

European plants, in order to replace these products by providing the right quality and better pricing.

Please share insights into the roadmap for Decarbonisation /Climate action and the steps your organization is taking in this direction?

Vipul Organics Limited has been very mindful about adopting sustainable manufacturing practices by taking direct action in reducing the use of natural resources such as water, coal, etc. We started having our plants ZLD: Zero Liquid Discharge since 2017 by converting one plant after another to ZLD, wherein we reuse and recycle 98% of water used. This has drastically reduced our consumption of fresh water and has helped us achieve our target of being self-sustainable in handling effluent.

For the chemical industry, water is an essential resource and we understand that it's going to be more and more challenging to get pure water. Therefore, as a policy we have decided that going forward, we will be adopting all manufacturing processes in such a way that we recycle and reuse the maximum amount of water.

We have also started using clean, green, biofuel in our plants wherein we use Briquettes, which is a by-product of agricultural waste, and have therefore reduced the use of coal drastically. With these practices we have also attained ISO 14001:2015 certification that focuses on Environmental management systems and also ISO 45001:2018 certification, for Occupational Health and Safety.

In your view, what will be the implications of slowdown in China's economy as most of the capacities are operating at less than 50% utilization? What will your strategy be to tackle this eventuality?

China is a giant in terms of the capacities and the output, which contribute significantly to global consumption. It is also true that the plants in China are operating at 50% utilization, which is a matter of concern. But we also understand the challenges faced in the world which has resulted into this. There has been a big slowdown in the consumption of China which is also a big factor in reduction of output for the Chinese manufacturers.

Another important aspect is that China is known for manufacturing for the masses. We need to focus on products which are specialty and tailor made for our customers' needs. This then becomes our USP and adds value to our business. Also, India is growing in terms of consumption and we are much better placed in terms of growth opportunity vis a vis the world. We are focusing significantly on taking care of the growing demand within India wherein the Government is looking at promoting locally made products.

In addition, China's challenges in political, health and environmental segments benefit India since customers are willing to pay a premium on Indian goods for the peace of mind and surety of supply chain.

In the backdrop of current slowdown in the global market, do you expect to start investing in new capacities in the next 2-3 years?

Vipul Organics Limited has a well-defined expansion plan in place and we are seeing extensive opportunities in India as well as globally for the color business.

We are planning to triple our capacities in the next two years of time frame both in Pigments as well as Pigment intermediates, and have commenced construction at our Greenfield facility at Sayakha in Gujarat recently. The first phase should be functional towards the end of the next financial year.

The goal is not to chase to be the "Biggest" but to be the "Best". We are growing steadily in Pigment Dispersion business which allows us to aggressively use our own pigments and makes our product line stronger in both backward and forward integration.

We are working broadly to develop newer chemistries which used to primarily be dominated by the German companies so that we fill in the vacuum which is created by the issues faced by some European color companies.

We are seeing good potential in newer applications such as Paper, Cosmetics and seed coloring which would help us create value for the company.

We are also working out plans to set up our own stock points outside of India for faster delivery and to be in close proximity to our customers to serve them better.

All in all, we see a rosy future ahead and we hope to capitalize on the space being created with Europe + and China + categories as well as focus on newer dimensions and categories opening up both in the domestic market and globally.

Chemical Engineering World

Approach to Biomass-Based Specialty Chemicals is a Transferal to Global Landscape

Godavari Biorefineries Limited has strategically positioned itself as a global leader by consistently pursuing a high-value approach in the utilization of various feedstock units such as sugarcane, molasses, ethyl alcohol, bagasse, and, in the future, diverse biomass sources. The company's vision, as articulated by **CMD, Samir Somaiya**, extends beyond traditional industrial practices, emphasizing the creation of superior value compared to global counterparts. He highlights Godavari's strategy, with focus on decarbonization. Recognizing the imperative to mitigate environmental impact, he divulges his engagement in the development of innovative production processes.

Samir Somaiya Chairman and Managing Director Godavari Biorefineries Limited

How do you anticipate the Europe Plus strategy to pan out, and how are you preparing to address this opportunity?

As Europe races towards carbon neutrality, a transformative wave is cresting – the surge for renewable raw materials. Godavari Biorefineries Limited, riding this tide, stands poised to become a crucial partner in Europe's sustainable voyage. Our renewable sugarcane bagasse fuels an ever-expanding fleet of bio-based products, from ethanol

and ethyl acetate to bio-acetic acid, each a potent weapon against fossil-fuel dominance. These heroes not only boast up to 80% lower carbon footprints but also champion a circular economy, breathing new life into waste biomass. But our commitment goes beyond products. We forge deep bonds with European companies, co-creating solutions that cater to their specific needs, like tailor-made bioplastics. Innovation hums in our labs, constantly refining our offerings for performance and affordability. And to ensure unwavering trust, transparency sails alongside us, guided by robust certifications and impeccable traceability. In essence, partnering with Godavari Biorefineries Limited isn't just about sourcing sustainable materials; it's about joining hands to reimagine a future where industry thrives in harmony with nature. So, as Europe charts its course towards a greener tomorrow, Godavari Biorefineries Limited compasses, a guide towards a future where every step leaves a lighter footprint.

Please share insights into the roadmap for Decarbonisation /Climate action and the steps your organization is taking in this direction?

At Godavari Biorefineries Limited, climate action isn't just a buzzword; it's woven into the very fabric of our business. We're not just producing sustainable products - we're actively driving decarbonization across the entire value chain.

Our low-carbon footprint starts with our foundation: renewable feedstocks, sugarcane bagasse, a readily available and abundant resource, fuels our biorefineries, replacing fossil fuels and significantly reducing our carbon footprint. But we don't stop there. We've meticulously documented and measured our Scope 1, 2, and 3 emissions, gaining a deep understanding of our environmental impact.

Now, armed with this knowledge, we're charting a clear roadmap towards decarbonization. This roadmap will be built on a multi-pronged approach:

- Optimizing our processes: We're constantly innovating to improve efficiency and minimize waste throughout our operations. This includes optimizing energy consumption, reducing water usage, and implementing circular economy principles to minimize waste generation.
- Investing in renewable energy: We're actively transitioning towards renewable energy sources like solar and wind power to further reduce our reliance on fossil fuels. This not only lowers our own emissions but also fosters a cleaner energy landscape for the future.
- Developing carbon-neutral products: Our R&D team is dedicated to developing new bio-based

products with even lower carbon footprints. This includes exploring carbon capture and utilization technologies to turn emissions into valuable resources.

 Collaboration and transparency: We believe in working together for a sustainable future. We're committed to collaborating with stakeholders, including customers, suppliers, and policymakers, to share best practices and drive collective action towards decarbonization. We also maintain transparency through regular reporting on our progress and achievements.

Although bagasse is our largest source of fuel for generating steam, we also do use coal. We are articulating strategies to pelletize bagasse and use it to partly substitute coal. Our feedstock (sugarcane) is made using chemical fertilizers and pesticides. We are working with faculty of Somaiya Vidyavihar University to combine traditional practices of agro ecology with modern method to reduce the carbon footprint and in fact increase spill carbon.

At Godavari Biorefineries Limited, we're not just mitigating climate change; we're actively leading the charge towards a greener future. By continuously reducing our emissions, investing in renewable resources, and collaborating for a sustainable future, we're proving that business can thrive in harmony with the environment.

In your view, what will be the implications of slowdown in China's economy as most of the capacities are operating at less than 50% utilization? What will your strategy be to tackle this eventuality?

The specter of China's economic slowdown, with underutilized capacities looming large, paints a complex picture for Indian companies. While some see a fleeting market share grab, Godavari Biorefineries Limited recognizes a nuanced dance between peril and opportunity.

The threat of cheap Chinese imports, fueled by excess production and destocking, casts a shadow of price pressure, potentially squeezing profit margins. But within this haze, we also see possibilities. By

leveraging our commitment to high-quality, bio-based solutions derived from sustainable resources, we can differentiate ourselves and cater to niche markets seeking eco-friendly alternatives.

Furthermore, this slowdown presents a moment to amplify India's "Make in India" ambitions. We at Godavari Biorefineries Limited are actively exploring ways to enhance domestic production, building resilient supply chains that reduce dependence on China and foster self-reliance.

At the core of our strategy lies forging deep partnerships with Indian customers. We believe in cocreating solutions, not just conducting transactions. By collaborating, we can navigate challenges and unlock opportunities, propelling growth and innovation within the Indian market.

Our unwavering commitment to research and development equips us to continuously improve product performance, efficiency, and sustainability. This allows us to stay ahead of the curve and offer unique solutions that cater to diverse market demands.

China's slowdown, while presenting undeniable challenges, also whispers promises of a stronger, more self-reliant India. By embracing innovation, differentiation, and deep customer partnerships, Godavari Biorefineries Limited not only aims to weather this storm but also emerge as a leader in India's sustainable, resilient future. We believe this is not just our strategy, but our shared responsibility, and we invite you to join us on this exciting journey.

In the backdrop of current slowdown in the global market, do you expect to start investing in new capacities in the next 2-3 years?

The current global slowdown undoubtedly raises questions about new investments, but at Godavari Biorefineries Limited, we see it as a phase to solidify our focus on customized solutions and future-proof innovation. While the broader market might take a breather, our commitment to co-creating specialty chemicals with our customers remains unwavering.

Think of it like carefully nurturing seeds to bloom into vibrant products. We invest significant time and

resources in developing these customized solutions alongside our customers, tailoring them to their unique needs and market demands. As these development projects reach successful fruition, we naturally transition into the next phase - scaling up production to bring these innovations to life. Therefore, instead of a fixed timeline for new capacity investments, we view it as an organic progression linked to the success of our ongoing co-creation projects. If a project holds immense potential and market demand is favorable, we wouldn't hesitate to invest in the necessary capacity to bring it to market. So, while the global slowdown might influence the pace of market expansion, our dedication to ongoing investments in R&D and tailormade solutions ensures that we're not simply waiting for the storm to pass, but actively nurturing the seeds of future growth.

In essence, our investment strategy is driven by strategic partnerships and innovation, not solely by market fluctuations. We believe in building a future where specialty chemicals are not just commodities, but customized solutions that address specific market needs. This focus on innovation and co-creation allows us to remain agile and adaptable, ready to seize opportunities whenever they arise, even in a challenging global climate.

We are confident that by staying laser-focused on customer partnerships and innovative solutions, we can not only weather the current slowdown but also emerge stronger, paving the way for a future where sustainable and customized bio-based chemicals lead the way.

Beyond Compliance: CO₂ Capture as a Catalyst for Steel Industry Sustainability

The global steel industry, long recognized as a cornerstone of economic development, is facing unprecedented challenges in the wake of increasing concerns about climate change. The industry is a major contributor to carbon dioxide (CO₂) emissions accounting between 7% - 9% of global emissions. **Nitin Sarna, Co- Founder and Director of Catalyst Environment Technology Solutions Private Limited (CETS)** draws attention on the mounting pressure to adopt sustainable practices that go beyond mere compliance with environmental regulations. In response he affirms that CO₂ capture has emerged as a transformative solution, promising to propel the steel sector into a new era of sustainability. This article aims to explore in depth the potential of CO₂ capture technologies in reshaping the future of the steel industry.

S teel production emits approximately 2.5 metric tons of CO_2 per ton of steel. In China the carbon emissions are higher, with a ratio of 3 tons of CO_2 per ton of steel.

The Carbon Footprint Challenge:

Traditionally characterized by energy-intensive processes that heavily rely on fossil fuels, steel manufacturing has by extension contributed significantly to the industry's substantial carbon footprint. As global regulatory bodies tighten emission standards, particularly the EU zone, the steel sector is compelled to explore innovative approaches to reduce its environmental impact.

Revolutionizing CO2 Reduction in the Steel Industry:

In a bid to combat carbon emissions, the steel industry is embracing innovative approaches to capture and utilize CO₂. Two prominent methods gaining momentum are carbon capture and storage (CCS) and carbon capture and utilization (CCU);

 Carbon Capture & Storage (CCS): Involves capturing CO₂ emissions at their source and safely storing them underground, effectively preventing their release into the atmosphere.

 Carbon Capture & Utilisation (CCU): On the other hand, CCU aims to transform CO₂ into valuable products like chemicals or construction materials providing a dual advantage of reducing emissions and maximizing resource utilization. These cutting-edge technologies are revolutionizing the steel industry's approach to CO₂ reduction, paving the way for a more sustainable future.

Understanding Carbon Capture Technologies

Using either of the above goals, CO₂ is captured in the following parts of the steel manufacturing process

 Post-Combustion Capture : One of the most common methods of carbon capture is postcombustion capture. This technology involves capturing and separating CO₂ from flue gases after the combustion process. Chemical absorption and physical adsorption are two prevalent techniques used for post-combustion capture. Chemical absorption involves using solvents to absorb CO₂,

FEATURES

while physical adsorption relies on solid materials to trap CO₂ molecules.

Pre-Combustion Capture :

Pre combustion capture involves the removal of CO₂ before the combustion process. This is achieved by converting carbon-containing fuels into a mixture of hydrogen and carbon monoxide, known as synthesis gas or syngas. The CO₂ is then separated from the syngas, leaving a hydrogenrich fuel that can be used for combustion. Precombustion capture with absorption is considered one of the most promising technologies due to its high efficiency.

 Looping Cycles: Another approach to carbon capture is the use of looping cycles. These cycles involve the circulation of a solid material between two reactors. In the first reactor, carbon dioxide is captured, while in the second reactor, the captured CO₂ is released, allowing for its separation and storage. Looping cycles offer the advantage of high CO₂ capture efficiency.

Decarbonizing the steel industry is crucial for achieving global sustainability goals. Carbon capture technologies offer promising solutions to reduce carbon emissions from the steelmaking process. Through a systematic review of various carbon capture technologies, we have explored the potential of post-combustion, looping cycles, and pre-combustion technologies for carbon capture in the steel industry.

Evaluating the Deployment of Carbon Capture Technologies

To evaluate the effectiveness of different carbon capture technologies, several key performance indicators

(KPIs) are considered. These KPIs include an energy penalty, carbon emissions abatement potential, cost, technology readiness level, and practical deployment considerations. A comprehensive analysis of these KPIs helps in making informed decisions regarding the selection and integration of carbon capture (CC) technologies in the steelmaking process.

 Energy Penalty: The energy penalty refers to the additional energy required to implement carbon capture technologies. It is important to minimize the energy penalty to ensure the overall efficiency of the steelmaking process.

Different Carbon Capture technologies have varying energy penalties based on the type of furnace and careful consideration is required to strike a balance between carbon capture and energy consumption.

- Carbon Emissions Abatement Potential: The carbon emissions abatement potential varies depending on the technology used. Technologies with higher abatement potential contribute significantly to achieving carbon reduction targets.
- Economic Assessment: Beyond the evident environmental advantages, CO₂ capture presents a compelling economic case for the steel industry. As governments and consumers increasingly prioritize sustainable practices, companies that proactively embrace carbon capture technologies gain a significant competitive edge.

Carbon-neutral steel production not only meets regulatory requirements but also appeals to environmentally conscious customers fostering brand loyalty and market differentiation.

- Technology Readiness Level: Technology readiness level (TRL) indicates the maturity and practical applicability of a technology. Different CC technologies are at varying TRLs, with some technologies already being commercially viable and others still in the research and development phase. Considering the TRL of a technology is essential for its successful integration into the steelmaking process.
- Collaborative Initiatives: Transitioning to sustainable steel production necessitates collaboration among various industry stakeholders, including manufacturers, government bodies, and technology providers. Governments can play a crucial role in incentivizing the adoption of CO₂ capture technologies through grants and tax benefits, fostering a conducive environment for innovation. Additionally, industry leaders can form strategic partnerships to share knowledge, resources, and best practices, thereby accelerating the industry's shift towards sustainability.
- Environmental Impact: The incorporation of CO₂ capture technologies has the potential to significantly reduce the steel industry's carbon footprint. By capturing CO₂ emissions at the source, these technologies mitigate the release of greenhouse gases into the atmosphere, contributing to global efforts to combat climate change. Furthermore, the captured CO₂ can be repurposed or safely stored, preventing its contribution to the greenhouse effect.

 Practical Deployment Considerations: Apart from technical factors, practical deployment considerations also impact the implementation of Carbon Capture (CC) technologies. Factors such as infrastructure requirements, availability of raw materials, regulatory frameworks, and public acceptance play a significant role in the successful deployment of these technologies.

Emergence Of a Circular Economy

 While challenges exist, ongoing research and development efforts aim to overcome these barriers and pave the way for a sustainable and decarbonized steel industry. By integrating carbon capture technologies with the steel and chemical industries, a transformative and merged industry can be achieved contributing to a circular economy and a low-carbon future.

Challenges & the Need for Intervention

 While carbon capture technologies show promise in decarbonizing the steel industry, several barriers need to be addressed for their practical implementation. The high costs associated with these systems remain a significant challenge, requiring further research and development efforts to reduce costs. Additionally, infrastructure requirements, policy frameworks, and public acceptance need to be considered to ensure the successful deployment of these technologies.

In conclusion, the steel industry's investment in CO2 capture technologies, including post-combustion and pre-combustion capture, holds great potential for decarbonization. These technologies not only contribute to emissions reduction but also offer opportunities for resource utilization. By revolutionizing the steel industry's approach to CO₂ reduction, we can pave the way for a more sustainable and environmentally friendly future. ■

Author

Nitin Sarna Co- Founder and Director Catalyst Environment Technology Solutions Private Limited (CETS)

Strengthening Commitment towards HSE

Nayara Energy owns India's second largest single site refinery at Vadinar, Gujarat with a capacity of 20 MMTPA. Being one of the world's most modern and complex refineries, Health, Safety and Environment (HSE) is a key priority for Nayara Energy. We are committed to provide safe operations and workplaces, to protect the health and safety of our employees and contractors, as well as to mitigate any environmental impact of our operations.

N ayara has always been at the forefront in implementing innovative ideas, investing in safety of assets and people, having exhibited proven track record in the past, continually sustaining and progressing ahead, with process safety and digitization as its prime aspect and setting benchmark at an early outset.

At Nayara, significant importance is given to each safety element and towards imbibing best practices. Some of the best practices and innovations at Nayara include: Online (Digitized monitoring) web-based platforms-Implementation of a digitized web based platform for accessing all process safety information, operating procedures, training validations, management of change, mechanical integrity, emergency response and planning, monitoring work permits, asset performance and audit compliances, executing incident investigation and hazard analysis tracking etc.

Setting up PSM Centre: Nayara Energy has set up a PSM Center of Excellence in collaboration with Premier Indian Institute of Technology (IIT Delhi) & Gexcon,

thereby setting a benchmark for other industries. The Company is developing the required infrastructure for carrying out extensive safety training programs, framing safety course curriculum, conducting process safety related studies and audits by sharing industrial expertise & experience.

Safety Audit: The Company conducts an assessment audit every five years to identify the gaps in the Process Safety Management Implementation based on OSHA PSM & CCPS RBPS systems. A renowned third-party consultant is invited to conduct the assessment, study and to create an action plan for implementation.

Competency Mapping and Assessment: Competency Mapping and Assessment of employees and contractual employees has been core for Nayara. This includes online validation, psychometric evaluations, training need-identification, job rotations etc.

Best of Best Scheme: To promote operational excellence through healthy competition amongst the Units, "BEST OF BEST" scheme has been developed wherein the participating teams are challenged and motivated to inculcate Safety & Operational Excellence in day-to day activities. The scheme evaluation is based on HSE and Maintenance & Reliability criterion.

Implementation of Process Safety Management System: 13 Process Safety Management System Elements have been implemented at our Refinery since 2008. The Refinery started monitoring Process Safety Performance using the Leading & Lagging Indicator Metrics espoused by the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE) in 2010-11.

Investing in Safety: The top-most priority at Nayara, the company undertakes continuous and extensive endeavours to protect workers by from workplace injuries and illnesses. The Company has made some key investments includes enhancing the Safety features of Process Plants by installing Retractable Grounding Assembly (RGA) for Class A product tanks.

Provision of full surface Fire Fighting System: In view of safety of highly flammable storage tanks, the firefighting ability for full surface fire extinguishment has been enhanced at Nayara energy by implementing provision of Full Surface Fire Fighting System for Crude Oil Tankages.

Rim Seal Fire Protection System for Storage Tanks: On detection of the smallest fire, an alarm is triggered, and the extinguishing media is actuated immediately. Rim Seal Fire protection system has been installed for class-A product storage tanks in various locations.

Environmental Safety: The Refinery has well established Pollution Monitoring & Control Systems in place with Ambient Air Quality Monitoring Stations, Emission Monitoring System for Stacks hooked up with CPCB enabling Real Time Data Monitoring and a sophisticated Leak Detection & Repair (LDAR) program which is an integral part for VOC emission monitoring and control from refinery.

Waste Management: The practice of keeping recyclable waste material category wise in separate bin at the source of waste generation is followed extensively and the behaviour ingrained in the team through regular campaigns. Hazardous Waste Pits and hazardous waste Storage Sheds have been developed in the refinery for storage of waste. Standard Operating Procedure has been implemented for handling and disposal of waste.

Mangrove Afforestation: Nayara Energy Limited has done voluntary Mangrove Afforestation in 175 Ha. Land.

Rainwater harvesting & ground water recharge: Six reservoirs / ponds have been developed within the Refinery premises for storage and recharging of ground water along with building of ground water recharge wells within the Refinery.

GUMPS sensors for monitoring pipeline corrosion: Implementation of Guided Ultrasonic Monitoring Pipeline System (GUMPS) sensors for monitoring and getting precise information on corrosion of pipelines, leading to a more detailed inspection of concern area. GUMPS sensors system takes first reading of pipe cross section at the time of installation and establishes a signature reading. The subsequent measurements are then compared to the new data to establish reduction in area of pipe cross section. This not only helps in maintaining real time monitoring on corrosion of pipelines but also keeps track the growth of defects in the pipeline.

Use of radiotracer technique: Radiotracer technique has been adopted to identify any leaks in heat exchanger circuit. Collimated radiation detectors are placed on the tube side outlet pipes of heat exchangers to detect ingression.

Implementation of safety monitoring of activities: To enhance the safety monitoring of turnaround activities, drones and cameras are used for monitoring critical activities at non-approachable locations. In case of non-compliance in the safety requirements, the camera captures photos and sends a mail to the configured users, which helps to immediately fulfil the safety requirements.

Case study

The company reported zero major Process Incidents (Tier 1) since 2014 and \witnessed more than 75% reduction in Minor Process events Incidents in last 5 years. In addition, the number of Trip Interlocks bypassed was brought down to zero.

The Company also completed 2 full cycles of Re-HAZOP studies till date and 3rd Re-HAZOP study of the Refinery is currently under progress

While QRA studies are now included as part of PHA revalidation programs in the Refinery complex, the refinery conducted SIL Classification and Verification studies for its Safety Instrumented Functions (SIFs).

The company also achieved more than 98% compliance with Inspection, Testing, and Preventive Maintenance (ITPM) Plans for Super-critical Equipment. ■

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Digitalization to Improve Water & Wastewater Processes

ndia is at the precipice of an unparalleled water crisis. With its four reservoirs running dry, the country's sixth largest city, Chennai witnessed the brunt of this crisis last year. This disruption to lives and livelihoods forced a sharp focus on the country's existing water resources and processes.

According to a report by NITI Aayog in 2018, approximately 600 million Indians are dealing with high-to-extreme water stress and over 200,000 people die every year due to inadequate access to safe drinking water. With climate change aggravating existing conditions and the water table expected to deteriorate further, the demand for water is expected to surpass available supply by 2050.

Wastewater treatment has emerged as one of the primary alternatives to improve water availability without adding to the existing stress on fresh water. However, according to a 2015 report released by the Central Pollution Control Board, India currently treats only 37% of its existing wastewater . While water treatment has improved in the recent years, large scale adoption of wastewater processes has still not become a norm in the country.

Additionally, water leakage, uneven distribution of water resources, lack of accessibility and inter-state dynamics have put a damper on the effectiveness of existing water management processes.

A robust water management strategy will have to account for all these challenges to create tangible solutions to combat these challenges and mitigate some of the risks involved. This strategy should be able to address water management at a micro and macro level. While individuals must work towards improving their awareness and optimizing their water utility in their homes, organizations and the government should work towards tackling water management in a more holistic manner. The strategy must also include elements of flexibility that allows it to adapt to changing times, dynamics, socio-economic scenarios and technologies in order to stay relevant.

Impact of digitalization on the water industry

Digitalization and technologies such as Big Data, Artificial Intelligence (AI) and Internet of Things (IoT) have been revolutionizing industries across the globe, they have been able to successfully improve the efficiency of a process or a product while minimizing risks or other external issues.

While these technologies were introduced in the last decade, they are expected to be the driving force of this new decade. Companies are also witnessing a paradigm shift by embarking on a vision to digitally transform themselves and streamline processes in order to stay relevant.

The water industry is also not immune to this revolution and can use relevant technologies to address challenges. Globally, governments are working with each other and other private companies to leverage their digital knowledge to improve water availability and scarcity.

Successful digital transformations would require the right knowledge transfer, public-private partnerships and forward-looking investments.

Challenges hindering digital adoption

While digitization has the capacity to revolutionize industries with the use of the right technologies, the transformation itself faces several challenges.

Organizations fear that digital transformations might require significant overhaul of existing processes and incur heavy costs during the process. On the other hand, government bodies and local bodies need to enhance their knowledge of these new technologies.

FEATURES

However, several steps have been taken proactively towards improving the rate of adoption. For example, India is collaborating with countries like Israel to leverage the country's knowledge and technology related to water and wastewater. Municipalities are also working closely with technology centric startups and companies to synergize their competencies.

While digitization and the adoption of the new-age technologies have built-in costs for implementation, their benefits outweigh these initial costs in the long haul. Such technologies are also imminent for growth and development in the future.

Advantages of digitization in the water industry

Digital technologies can not only enhance the efficiency of a pump but also the entire manufacturing process of a pump. Also, it can be used to provide insights for the entire water process. Globally, they have proven extremely useful in detecting leakages, phasing out aging equipment and extending the lifecycle of its newer counterparts, preventing abnormalities, monitoring water quality and ensuring the reliability of water supply among other utilities.

 Understanding customer requirements through data analytics: Intelligent technology provides the opportunity to analyze water processes to understand consumption patterns and catch disruptions ahead of time. Through efficient sensor-based technology, the flow, speed, temperature and pressure of water in a pipe can be understood and converted into actionable insights. Intelligent pumps will be able to further use these insights to successfully meet customer expectations / demands.

For example, traditional pumps transport water at a fixed rate and speed. This could lead to increased electricity and maintenance costs as energy is wasted and the additional pressure might cause higher leakages apart from wear and tear. On the hand, intelligent pumps can use integrated sensors to understand the demand requirement and adapt accordingly. This enables significant energy and water savings. Such solutions are particularly beneficial for hotels, hospitals, office complexes and other commercial buildings that have fixed peak and lean hours. Data analytics is also used in wastewater processes. Big data tools can analyze the data and provide technicians with relevant insights on a daily basis. This will help customers further improve the resilience of their wastewater systems.

 Maximizing performance: Digital solutions such as intelligent pumps can run for long periods of time at maximum efficiency, with minimal human intervention. In spite of the initial costs, their efficient motor ensures longer lifecycle by reducing wear and tear and result in cost effectiveness.

Pumps are a critical element in most wastewater processes. They are involved in many stages which includes transportation of water, processing and treating of hard effluents etc. For the success of any wastewater process it requires a pump to be intelligent so that it can work optimally.

In addition to this, excessive pressure on the pipelines during times of low demand is inefficient and can lead to water leakage. A smart demand-based distribution system will be able to understand the flow and utilization rate to predict expected demand. This ensures that there is constant pressure in the pipeline with minimal wastage.

 Improving energy efficiency: Energy and water are two intricate, inter-connected resources. The dependency on water has a proportional influence on the dependency of traditional energy. Considering this, it is important to improve the energy-efficiency of water and wastewater processes.

Intelligent pumping solutions are capable of using very minimal energy to produce unmatched results. They can also manage energy optimally on the basis of demand to minimize wastage and operational costs subsequently.

 Predictive maintenance: Sensor based technology and data analysis has been driving predictive maintenance in the water industry. Sensors can detect abnormalities, leakages in pipelines or potential failures of parts. This helps customers provide maintenance before there is actual downtime, thereby improving the cost efficiency of the entire operation.

FEATURES

Such technologies are being adopted by local municipalities across the country to prevent water leakages during the distribution stage. In India, 40-70% of the water is lost during this transportation phase. With the help of intelligent solutions, this number can be brought down to 20%.

 Real time monitoring: Intelligent solutions will be able to monitor flow, speed, temperature and pressure of water processes on a real time basis. They can also enable necessary interventions during emergencies by alerting technicians and engineers. This minimizes the need for manual intervention and also enables remote working by sending these alerts to phones and monitors.

Trends in digitalization

The increasing democratization and affordability of digital technologies along with the increased demand for integrated solutions is directly proportional to the increase in pace of adoption.

The water industry is currently witnessing early stages of digital adoption and will be able to significantly benefit from the utility of these technologies. AI, IoT and other technologies are expected to become a mainstay for comprehensive solutions that can address the water challenges in the country. This growth needs to be aided by positive policy outlook and an open-minded approach towards digitization. ■

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Use of High-Efficiency Mist Cooling System as a Superior Alternative To Cooling Tower

When humidity is high, cooling tower fails to achieve desired cold water temperature which results in drop in vacuum maintained at exhaust of a turbine and in turn drop if Power plant capacity. Now it is time's need to find new solution to get desired cold-water temperature throughout year.

The ultimate Mist Creation Technology is the best alternative to conventional cooling towers. This advanced mist creation system can achieve an approach of 1 to 2°C to WBT as against 5 to 6°C approach for conventional cooling tower. Hence guaranteed cold water temperature of around 30°C could be obtained throughout the year tropical climate. Also, the spraying head is equivalent to the height of cooling towers thus requiring same pumping power. As mist creationsystem does not require fans for cooling it saves huge

amount of power. Also, as there are no moving parts involved in Mist creation system the maintenance cost is negligible and system runs trouble free.

In Process / Chemical Plants, product vapour generated in the process is condensed in a Heat exchanger and is recovered back.

The condensation of steam/ Vapour requires a cooling medium. In early days this was achieved by using water from a river, a basin or seawater. The cold water is pumped through a heat exchanger and the warm water is discharged back to the water source. This is called Once Through cooling system.

A once through system is an open loop system. The necessity to reduce the huge amount of water gave birth to the idea of closed loop system. Thus the Wet Cooling system came into effect.

In a wet cooling system, water is circulated to condense the steam in the same type of heat exchanger that is used in the once through cooling. The warm water, instead of being sent to the water source, is cooled in a cooling tower using air as the cooling medium. Only the water carried away due to evaporation, drift and blowdown needs to be replenished by make-up water. Thus requirement of water quantity is vastly reduced.

Wet Cooling Systems

The wet cooling tower system is based on the principle of evaporation. The heated water coming out of the surface condenser is cooled as it flows through a cooling tower, where air is forced through the tower by

PLAN A: HEAT EXCHANGER WITH COOLING TOWER

Circulation Water Cycle in Cooling Tower Plan A:

Circulation Water Cycle in MCS Plan B :

either mechanical or natural draft. Now a days, mostly, all wet cooling towers are mechanical draft cooling towers, where the air flow is accomplished by fans.

The Principle cooling device used in an Induced / forced draft cooling tower are Fans which run at the top of Cooling Tower (CT). Air enters through side louvers and escapes from the top. Water enters at the top and trickles down while getting cooled by air draft. A correctly designed induced draft CT can give an approach of 4 to 6°C to wet bulb temperature with a temp. drop of 10°C. Even a very highly efficient CT can not give an approach less than 4°C to WBT. Moreover, if ambient temperature or humidity levels rise, efficiency of CT reduces.

For a Chemical Plant, an induced draft cooling tower is designed to maintain Cold water temperature of 32°C at a WBT of 28°C with an approach of 4°C. Cooling Tower performs as desired during winter, early summer months. But during peak summer / Monsoon, efficiency of cooling tower reduces as humidity rises & its approach to WBT reaches beyond 6°C from design 4°C. Thus due to this rise in Cold Water temperature, these industries always experience loss in production by at least 5 to 7%. These losses do not occur in winter months. This means that the plant will operate at a reduced efficiency for almost 5 to 6 months in a year.

Mist Cooling System

MREPL has come out with a solution by designing MIST COOLING SYSTEM which is a high efficiency system, which ensures an approach of 1°C to prevailing wet bulb temperature with a Temp. drop of 12 to 15°C even in adverse climatic conditions.

In tropical conditions, worst wet bulb temperature even at coastal applications is maximum 30.5°C. Hence MCS will always maintain Cold Water of around 31°C+1°C throughout the year. No other cooling system can operate with such efficiency and it makes cooling tower/spray pond systems obsolete.

Salient Features Of Mist Cooling System

Cold Water Temperature

Mist Cooling System ensures an approach of 1°C to WBT with a temperature drop of 12°C to 15°C.

Energy Savings

Due to increase in DT, water quantity required at the process side is much less. MCS requires water pressure equivalent to the height of cooling tower as shown in the following diagrams. Hence, considerable amount of energy is saved on circulation water pumping. Also, MCS does not require any fans for cooling. Thus, a huge amount of energy is saved on circulation and cooling.

Maintenance

MCS has no moving parts. Also the material used in the mist cooling system is special grade saran polymer, a highly non-corrosive material having a life of more than 10-15 years. This makes MCS absolutely maintenance free. As against this, cooling towers require a heavy maintenance in form of replacement of louvers, fan blades, clamps etc. every year.

COMPARISON TABLE BETWEEN INDUCED DRAFT COOLING TOWER / FAN LESS COOLING TOWER & LOUVER TYPE MIST COOLING SYSTEM					
Sr. No.	Feature	Induced Draft Cooling Tower (IDCT)	Fan less / Jet Cooling Tower	Louver Type Mist Cooling System	
1	Approach to WBT	4 to 5 degrees.	6 to 8 degrees.	1 to 2 Degrees.	
2	Temperature Drop	8 to 10 Degrees	6 to 8 Degrees	Regular: 12 Degrees. Advanced Model guarantees up to 40 Degree C in a single stroke	
3	POWER CONSUMED (Comparison for a 1000 m3/hr circulation flow assuming IDCT's Total Power as 100%) (Please refer PLAN-A & PLAN-B)	100 HP : 100% (70 HP : 100% on Pumping & 30 HP : Fan)	100 HP : 100% (100 HP : 140% on Pumping & 00 HP : Fan)	70 HP : 70% (70 HP : 100 % on Pumping & 00 HP : Fan)	
4	Nozzles	Ordinary type which choke frequently	Ordinary Jet type which choke frequently	Special whirling type, choke- less design incorporating non- moving parts with 25 mm bore opening.	
5	Water droplet size	5 mm	2 to 3 mm	Atomized to 5 to 50 Microns	
6	Travel time	Less due to Downward fall only.	Less due to Downward fall only.	Two time travel due to upward & downward travel leads to Double air retention time	
7	Fills/ fins	Various types used - prone to scaling, need Periodical changing	Various types used - prone to scaling, need Periodical changing	ABSOLUTELY NO FILLS / NO FINS REQUIRED.	
8	Drift Loss	Same	Same	Same	
9	Make Up Water	same	same	Same due to similar hold up.	
10	Flexibility	Limited	Limited	Individual Line Isolation offers max. flexibility to use capacity as per requirement.	
11	Standby	Required	Not Required.	Not Required.	
12	Erection/delivery	Substantially high	Low	Fairly less	
13	Maintenance	Very high due to replacement of fills/ fins/ fan blades etc. Also due to deposition of dust on fills, efficiency reduces with time.	Very high due to replacement of fills/ fins etc. Also due to deposition of dust on fills, efficiency reduces with time.	Negligible maintenance due to choke less operation and non- moving parts.	
14	Aesthetics	Bulky, Generally most neglected part in a Plant	Untidy	Appears Fresh and Dynamic resembling active water like fountain	
15	Civil Construction	Heavy due to static and dynamic load	Less	Simple due to table top construction with static load	
16	Total Footprint	Less	Higher than CT	* More by 2 to 4 times to IDCT	

* Note: As capacity (Flow, M3/Hr) through MCS increases, ratio of area required between MCS and CT reduces.

Chokeless Design

MCS operates with a chokeless design. Size of smallest opening in MCS is more than one inch (25 MM) in diameter. Hence chances of particles choking the system are minimum.

Various Designs Of Mcs To Suit Site Conditions

Open Pond MCS: Here, MCS ensures an approach of 1°C to WBT with a Δ T of 12 to 15°C. Water loss due to drift is 0.1 to 0.25% depending on wind load.

Louver Type MCS: Here MCS pond is closed from

sides, up to a height of 8 to 10 mtrs. by louver type cover sheeting. This reduces the plot size by 60% of open pond design. MCS ensures an approach of 2.5°C to WBT with a Δ T of 12 to 15°C. Drift loss comes down to 0.02% and also space requirement reduces considerably.

Hybrid Mist Cooling Tower : MCS/LTMCS requires larger plot size in comparison to the Induced draft cooling tower. To enable some clients having space limitation at site to get advantages of MCS, The Hybrid Mist cooling tower design is introduced. Here, technology of MCS and Cooling tower is combined by using lower power fans to operate in combination with MCS.

System Flexibility (Capacity Turn Down Ratio)

We offer MCS with individual line isolation valve. MCS is the only system, which gives you such a high flexibility in operation.

Chemical Treatment

Chemical dosing requirements are similar to that of cooling tower as same hold up of water is maintained in suction pit due to Table top design of basin.

Make-Up Water Requirement

Due to latest Louver Type design, drift loss through MCS is reduced to 0.02% while maintaining an approach of around 2°C to wet bulb temperature. Hence, Overall make-up water quantity required is approximately same as compared to cooling towers. Pay Back Period: Considering All Above Benefits of the Mcs will be less than one year only. ■

Author

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Chemical Engineering World

Pipeline Integrity: Out of Sight does not Mean Out of Mind

Integrity of pipeline is now a major focus which may be attributed to a couple of factors, which include new legislation, technical advancements, strict penalties for accidental leakages, environmental concerns, ageing of pipelines and also considering the impact of pipeline related incidents have proven to be fatal. All elements of integrity are important since we know that the weakest part determines the strength of the entire system.

ipelines are the energy veins of the world. Much of the world runs on pipelines. From the time we get up in the morning until we go to bed at night, it's difficult to find a moment when we haven't used energy transported by a pipeline. Crossing the landscape largely buried, pipelines traverse quiet wilderness and bustling communities, providing the safest and most efficient method of hydrocarbon transportation in the world today. Out of sight does not mean out of mind. Integrity of pipeline is now a major focus which may be attributed to a couple of factors, which include new legislation, technical advancements, strict penalties for accidental leakages, environmental concerns, ageing of pipelines and also considering the impact of pipeline related incidents have proven to be fatal. All elements of integrity are important since we know that the weakest part determines the strength of the entire system.

What should be the objective of a pipe integrity management program?

A pipeline integrity management program should

Identify threats to pipeline integrity, potential consequences to the public and the environment in the event of a release, Rank segments of the pipeline system according to the risk each poses, Provide for assessment of the integrity of each segment in a timely manner based on identified threats and the risk to minimize the possibility of a release, Specify repairs or mitigative actions to carry out in a timely manner to prevent releases, Establish reassessment frequencies, Define preventive and mitigative measures to address relevant threats including those not covered by integrity assessments, Use the findings of integrity assessments to update and Improve the integrity management process.

What are the threats for pipeline integrity?

Pipeline Integrity threats are mainly categorized to be Time Dependent, Stable and Time Independent. Reassessment of the integrity a pipeline segment subject to a time-dependent anomaly growth mechanism should be carried out at appropriate intervals to minimize the risk of a pipeline failure caused by an anomaly that was too small or was

Fig. 1 Typical Process Flow for Integrity Management Programme Source: - API 1160, 2013 version

under the reporting size criteria detected in the last assessment growing to a size that would fail at maximum calculated surge pressure or 1.1 times MOP.

Accurate corrosion growth rates are needed to predict pipeline availability as a function of time, to identify the need for and timing of field investigations or repairs and to determine optimum re-inspection intervals. The consequences associated with using wrong corrosion growth rates range from the inefficient use of resources (time, people and money) on unnecessary repair/inspections to unexpected pipeline failures. The identification of where corrosion is active on a pipeline and how fast it is growing is a complex process which is understood in the general sense but is highly variable

There are various approaches that can be used to define corrosion growth rates for use in pipeline integrity assessments. The major advantage of using repeat ILI data to derive corrosion rates over other methods is that the ILI can provide growth rate information on the whole detectable corrosion distribution density giving visibility of what is happening along the entire pipeline. Further XYZ mapping plots the infrastructure and population density for risk assessment. Fingerprint ILI is warranted for the above to establish the initial pipeline health assessment post commissioning. In specifying a 'fingerprint' inspection the pipeline operator should consider why the inspection being is done, as this will affect the probability of detection (POD),probability of Identification (POI), defect reporting levels, assessment method and acceptance criteria that should be used.

The application of fixed rates can be very conservative and will lead in many cases to unnecessary repairs or if the rates are too low to an unsafe assessment of the future integrity of a pipeline. Using location specific (variable) growth rates (both scenarios of applying the maximum rate per pipe joint and defect specific rates) has been found to provide more realistic and targeted predictions of repair needs. The location specific growth rates give accurate predictions of the corrosion severity over time. With the benefit of this hindsight, the predictive analytics employed for evaluating and applying ILI based corrosion rates can be further improved and refined to give more

Fig. 2 Typical Reassessment Intervals Based on a Specific Failure-pressure-vs-anomaly-size Mode Source: - API 1160, 2013 version

accurate predictions of the future pipeline condition, the response schedule and optimized timing of reinspections.

Time is now to review multiple-data-set ILI results from several pipe joints with simulated defect locations from ILI surveys. The same has been implemented on BPCL pipelines as for ageing pipelines corrosion growth rates have been derived and very useful in aligning the reassessment intervals. Further the Fingerprint inspections have been implemented on our new pipelines creating a baseline data for the future advanced inspections. BPCL has established stringent inspection criteria at 0.95POD and 0.90POI to establish quality data for analysis. The ILI runs and subsequent signature analysis and data treatment have been very useful in uprating of pipelines and remaining life estimation.

Time is now to convert data to information to add value to the initiatives being taken and the amount being invested towards data gathering. The information gathered over time has to be translated into effective corrosion mitigation/control programs. Reviewing from a deeper understanding of information from corrosion monitoring and other sources is required. For effective corrosion control it is important to understand "where, when and why" pipeline damage takes place – the proactive and investigative approach as discussed shall be of great use and the inputs derived shall have a positive impact on the pipeline integrity matters

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Five Critical Measurements for the Chemical Industry

O² Measurement for Combustion Control

Eliminating Extractive Systems

METTLER TOLEDO offers a TDL solution that not only eliminates the alignment problem, but also simplifies analyzer installation and maintenance. The GPro 500 series of O2, CO, and moisture analyzers uses a unique design whereby the laser light emitted from the sensor head travels down a probe that is open to the process gas and is returned by a retroreflector back through the gas to a receiver which is also within the analyzer's head. This design means that alignment of the analyzer is not required, even if the process involves a significant temperature ramp. As sender and receiver are in a single instrument, only one flange needs to be installed into the duct, greatly simplifying installation. A range of unique process adaptions (such as the wafer cell for very narrow pipes) significantly increases the range of applications for the GPro 500.

pH Control in Aggressive Conditions 500% Increase in Sensor Lifetime

pH measurement is necessary in many stages of nitrogen-based fertilizer production, but the conditions are very tough on sensors. The InPro 4260i pH sensor is designed to tolerate extreme chemical processes. It contains a solid polymer reference electrolyte that provides excellent resistance to contaminating substances. And instead of a diaphragm that would quickly become clogged, it features an open junction. The long sensor lifetime of the InPro 4260i would reduce technicians' exposure to the production environment, as well as lower sensor costs. The sensor's Intelligent Sensor Management (ISM) technology provides further valuable benefits. ISM sensors can be calibrated in any convenient location, such as a maintenance shop.

IMPACT FEATURE

ORP and Conductivity

Fighting Corrosion, Scaling and Fouling

It is estimated that the global cost of oil and petrochemical refinery corrosion and deposition exceeds USD 15 billion annually. In cooling water systems a lot can be done to minimize it, with the help of dependable, intelligent measurement systems. The InPro 3250i is a pre-pressurized, liquid electrolyte sensor that delivers fast, accurate measurements. It features an auxiliary platinum electrode that offers a major benefit to Sinopec Sabic, the sensor can also measure ORP. Therefore, the number of measurement points in the recirculated water system could be reduced.

Sodium and Silica Measurement

Protect On-site Power Generation Equipment

To shield turbines from corrosion and scaling, sodium and silica in the power cycle must be maintained at negligible levels. Determining contamination at low ppb levels requires highly capable equipment. METTLER TOLEDO's 2300Na Sodium and 2800Si Silica Analyzers combine industry proven technology with innovative design to provide assurance of water purity in power cycle chemistry applications. The 2300Na Analyzer determines sodium levels by first conditioning the sample to prevent hydrogen ion interference by controlling the input flow and the pH, then uses a sodium ion selective sensor to precisely determine sodium levels. For silica determination the 2800Si Analyzer employs the colorimetric method, which involves adding reagents and then measuring the color change in the sample. The analyzer features automatic zeroing before each measurement, plus automatic sample conditioning and calibration.

Inductive Conductivity

Durable and Sensitive for Concentration Determination

Ensuring correct dilution of chemicals is important for process and cost efficiency. Conductivity measurement is a highly accurate determinant of concentration for a wide range of chemicals. Robust inductive conductivity sensors are ideal for this purpose. Modern inductive sensors such as the InPro 7250 have the sensitivity to detect very small changes in conductivity, which is necessary for accurate measurement. The media-wetted parts of the InPro 7250 are coated with perfluoroalkoxy alkane, a material that is highly resistant to organic and inorganic acids including nitric and hydrofluoric. As the surface is immune to contamination and deposit formation, high measurement accuracy and process reliability are always ensured. The large measuring range and concentration determination capability of the InPro 7250 PFA make it uniquely suitable for use in concentration control applications.

About METTLER TOLEDO

METTLER TOLEDO is a leading global manufacturer of precision instruments. The Company is the world's largest manufacturer and marketer of weighing instruments for use in laboratory, industrial and food retailing applications. The Company also holds topthree market positions for several related analytical instruments and is a leading provider of automated chemistry systems used in drug and chemical compound discovery and development. In addition, the Company is the world's largest manufacturer and marketer of metal detection systems used in production and packaging. Additional information about METTLER

TOLEDO is available at www.mt.com.

For more information Email us at – sales.sales@mt.com Call us toll-free at – 1800 22 8884 & 1800 1028 460 Visit: www.mt.com/pro

Evonik Leads the Way with World's First Bio-Based PA12 Powder for 3D Printing: INFINAM eCO PA12

Evonik, a renowned name in specialty chemicals, has made a groundbreaking leap in the 3D printing world with the launch of INFINAM eCO PA12. This revolutionary product, the first bio-based polyamide 12 (PA12) powder specifically designed for industrial 3D printing, marks a major milestone in sustainable manufacturing.

Replacing 100% of fossil feedstock with bio-circular raw materials sourced from waste cooking oil, INFINAM eCO PA12 stands out as a responsible and eco-friendly alternative to traditional PA12. This shift translates to a significantly reduced carbon footprint, aligning perfectly with Evonik's dedication to environmental stewardship.

But sustainability isn't the sole strength of INFINAM[®] eCO PA12. Despite its bio-based composition, it delivers outstanding mechanical properties, chemical resistance, and process ability on par with conventional PA12. This ensures high-performance 3D printed parts, ideal for various industrial applications.

Throughout the lifecycle of 3D printed parts made with INFINAM eCO PA12, greenhouse gas emissions are significantly lower, further bolstering its environmental credentials. For businesses seeking to minimize their environmental impact, INFINAM eCO PA12 opens up new possibilities for incorporating sustainability into their 3D printing operations. Unlike diverse industries, INFINAM eCO PA12 unlocks the potential for creating lighter yet exceptionally strong 3D printed parts.

Evonik's INFINAM eCO PA12 is a game-changer in the 3D printing landscape poised to empower businesses across industries to embrace a greener future while pushing the boundaries of 3D printing.

This pioneering innovation not only demonstrates the company's leadership in sustainable development but also paves the way for a more responsible and eco-conscious future for additive manufacturing.

Clariant's Breakthrough Catalyst: Fueling Cleaner and More Efficient Hydrogen Production

Clariant has taken a major step towards a cleaner energy future with the launch of a revolutionary new catalyst. This high-performance catalyst is designed to significantly improve the efficiency of hydrogen production, paving the way for a more sustainable and cost-effective transition to this clean fuel source.

Clariant's catalysts don the green cape by swapping out expensive, environmentally burdensome precious metals like platinum with readily available alternatives. This eco-friendly feat shrinks the environmental footprint of both catalyst production and hydrogen generation, making it a clear champion of energy efficiency. This resulted in reduced greenhouse gas emissions, paving the way for cleaner hydrogen production.

Dr. Thomas Schmidt, Head of Business Unit Catalysts at Clariant, emphasizes the significance of this innovation: "This game-changing catalyst paves the way for a cleaner and more sustainable future by significantly reducing energy consumption and emissions."

Clariant's new catalyst offers exciting possibilities for various applications such as:

- Fuel cell technology: Powering clean transportation and stationary fuel cells.
- Industrial processes: Replacing fossil fuels in various industrial applications.
- Energy storage: Enabling efficient and clean energy storage solutions.

This breakthrough from Clariant positions the company as a leader in the hydrogen economy and signifies its commitment to driving innovation for a cleaner and more sustainable future.

Huntsman unveils Liquid TPU for Sustainable Footwear

Huntsman has revolutionized the footwear industry with a first-of-its-kind liquid thermoplastic polyurethane (LTPU) called SMARTLITE[®] O. This innovative material promises faster, cleaner, and more sustainable production of high-performance midsoles for sports and athleisure shoes.

SMARTLITE O breaks away from traditional TPU methods like supercritical foaming, offering a simpler,

Chemical Engineering World

and single-step process. This translates to significant environmental benefits: less water, energy, waste, and carbon emissions. The material also shines in its circularity, readily converting into new materials even after use.

What makes SMARTLITE® O stand out is low-pressure casting machines handle SMARTLITE O, making it easy to use, scalable, and ideal for streamlining production. In-situ polymerization and adhesive-free bonding further boost efficiency. Despite its light weight (250 kg/m3), SMARTLITE® O delivers superior midsoles. It boasts excellent hydrolysis resistance, long-lasting comfort, and impressive rebound (> 50%), and the environmental advantages are undeniable. Less waste, lower energy consumption, and easy recycling make SMARTLITE O a champion for sustainable footwear.

Huntsman is partnering with Framas Group, a leading manufacturer, to bring SMARTLITE O to life. With a capacity of 2 million soling constructions per year, they're ready to collaborate with brands on sampling and orders.

Wacker's Silicone Magic

Imagine a gentle, super-strong hug from a silicone gel that stays put on your skin like a loyal friend, yet peels off easily without leaving a trace. That's the magic of Wacker's new SILPURAN 2124, a game-changer for wearables and medical devices. This adhesive marvel sticks like glue to sensors, catheters, and more, keeping them snug while being gentle enough for even the most sensitive skin.

But Wacker's innovation goes beyond just sticky wonders. They're also champions of the planet with their ELASTOSIL[®] eco line, silicone products made with bio-methanol instead of fossil fuels. This eco-friendly choice helps conserve precious resources while offering the same performance and versatility as traditional silicones. Think baby bottles that are kind to both your little one and the Earth.

And the surprises don't stop there! Wacker's ELASTOSIL® LR 3078 is another self-adhesive silicone that skips the messy bonding process for polycarbonate and other high-tech plastics. Imagine masks and medical devices that snap together seamlessly, saving time and money while creating durable, reliable products.

Wacker's silicone innovations are like a superhero team for healthcare. They're strong, gentle, and environmentally conscious, working together to improve patient comfort, reduce waste, and streamline production.

BASF & Linde: A Breath of Fresh Air with Carbon Capture Technology

BASF and Linde have developed a groundbreaking technology that converts captured CO₂ from industrial emissions into valuable chemicals and fuels. This innovative approach, known as Carbon Capture and Utilization (CCU), offers a promising solution to combat climate change.

The core of the technology is BASF's OASE blue process, which utilizes a highly stable amine-based solvent to capture CO₂ with high efficiency and low energy consumption. This captured CO₂ can then be transformed into various products, including methanol, urea, synthetic fuels, and even plastics.

The technology boasts several key features and benefits namely; reduced greenhouse gas emissions, circular

economy by utilizing captured CO₂ instead of virgin fossil resources and economic opportunities

While still in its early stages, the technology has already reached significant milestones.

The first large-scale CO₂ capture plant utilizing OASE blue is scheduled for construction in 2023 by the joint venture Capture-to-Use (CAP2U). Additionally, BASF's OASE process has been successfully used in over 400 plants worldwide, demonstrating its viability and reliability.

Both BASF and Linde are committed to ongoing research and development to further improve the efficiency and expand the applications of this technology. With its promising potential, this carbon capture and utilization technology represents a critical step towards a cleaner and more sustainable future.

Dow introduces a range of reduced carbon caustic soda products powered by renewable energy

Dow Cleans Up with Carbon-Conscious Caustic Soda: Up to 90% less CO₂, Same High Quality

Dow has taken a major step towards greener chemistry with the launch of Caustic DEC and TRACELIGHT DEC, two caustic soda products boasting up to 90% lower carbon dioxide emissions compared to traditional methods. These innovative offerings, part of Dow's Decarbia portfolio, empower customers to create more sustainable solutions without compromising quality.

The secret lies in renewable energy. Dow's electrolysis production process leverages this clean source to significantly reduce the carbon footprint of caustic soda, a vital ingredient in various industries. This translates to lower Scope 3 emissions for customers, helping them achieve their sustainability goals.

But the benefits don't stop there. Dow's Caustic DEC and TRACELIGHT[™] DEC maintain the same high-quality standards as their traditional counterparts, ensuring seamless integration into existing applications. From industrial processes to food production, these ecoconscious options offer a win-win for both the planet and your business.

Both its Stade and Schkopau production plants in Germany have earned the prestigious ISCC PLUS third-party certification, verifying the reduced carbon footprint of their caustic soda production through a mass balance approach. With its innovative Decarbia portfolio, Dow is paving the way for a greener future in chemistry. By offering high-performance, carbon-conscious solutions like Caustic DEC and TRACELIGHT DEC, Dow empowers customers across industries to embrace sustainability without sacrificing quality. This is a significant step towards a cleaner world, one caustic soda molecule at a time.

Covestro and Kronos Team Up for Sustainable Textile Printing

Covestro's Impranil CQ DLU bio-based dispersion (34% plant-origin carbon) offers a sustainable alternative to traditional textile coatings. It boasts the same performance as the popular Impranil DLU, making it an easy switch for manufacturers.

Key benefits of Impranil CQ DLU include Less reliance on fossil fuels, excellent properties like hydrolysis resistance, lightfastness, and scratch resistance and sustainable choice as labeled with Covestro's "Circular Intelligence" (CQ) designation for products with over 25% alternative raw materials.

Covestro and Kronos also collaborate on solutions for digital inkjet printing:

KRONOS 9900 Digital White pigment concentrate: Compatible with Covestro's INSQIN[®] polyurethane binders for white inks. Impranil DL 1606: New binder specifically designed to address sagging in direct-tofoil printing.

These innovations pave the way for a more sustainable textile industry with reduced CO₂ emissions, resource efficiency and shorter production times

EASYSEAL: Revolutionizing Softgel Production with Enhanced Leak Resistance

Faced with the ongoing challenge of leaky softgels, pharmaceutical manufacturers often endure significant production losses, reduced yields, and increased costs. GELITA, a recognized leader in gelatin solutions, proudly introduces EASYSEAL, a novel pharmaceutical-grade gelatin designed to revolutionize the softgel production landscape.

EASYSEAL addresses the industry-wide issue of faulty capsule seams head-on, offering a unique and effective solution. Its optimized formulation dramatically enhances seam formation and thickness, resulting in

superior seal strength and stability. This translates to a significant reduction in leaky softgels, minimizing product loss and maximizing yield.

The benefits of EASYSEAL extend beyond leak prevention. Its exceptional process ability allows for seamless integration into existing production lines, enabling manufacturers to experience increased efficiency and throughput. EASYSEAL's versatility shines in its ability to handle even challenging ingredients and equipment, including those requiring double step die tooling. Furthermore, its reduced temperature sensitivity translates to enhanced energy efficiency and increased production capacity.

Beyond its technical prowess, EASYSEAL prioritizes regulatory compliance, being manufactured in accordance with FDA, HACCP, ISO9001, and FSSC22000 regulations. Additionally, a readily available C-DMF (China Drug Masterfile) facilitates market entry for manufacturers seeking to tap into the burgeoning Chinese market.

With the global pharmaceutical gelatin market for soft capsules projected to grow at a CAGR of 6.1%, EASYSEAL is positioned to become a gamechanger. By eliminating leakers, optimizing production efficiency, and ensuring superior quality, it empowers manufacturers to achieve significant cost savings and enhance profitability.

Vipul Organics Limited Unveils three new Paper focused products at PAPEREX 2023

Vipul Organics Limited, the BSE listed (VIPULORG / 530627) leading Specialty Chemicals company in the pigments and dyes segment, received a very positive response from the industry at PAPEREX 2023, the largest paper industry exhibition in India. Vipul Organics also unveiled three new paper focused colorant solutions at the event.

The launch highlighted:

- Sunlonic range of modified Basic Dyes / Cationic Dyes developed specially for paper customers who have Size Press. This new innovative way of using Colorants is for packaging paper which significantly eases the process of colouring the paper and reduces the consumption of paper thereby giving techno commercial benefit to the customer.
- SunPulp Red 981 dispersion, a high performance pigment dispersion which gives excellent properties and enhances red color value for writing and printing applications
- A series of Colorants which can replace the traditional dyes in paper coating application. This development reduces the load on ETP significantly and enhances the properties of paper.

Vipul Organics is focusing on Paper segment for its range of colorants. The company already supplies its dyes, pigments and dispersions to leading Paper companies in India and is on track to increase its client base in the category. Vipul Organics is presenting its complete range of products under two categories:

- SunPulp Dispersions: Exclusively developed for the paper application.
- SunDirect Dyes: This range of Direct Dyes is for paper coating application.

Vipul Organics are upbeat about the paper industry and we have been working hard to provide innovative colouring solutions to all their colouring needs. The new products are meant to address the pain points of the Paper Industry, and together with our existing products, we offer single point solution to the industry for all their colouring requirements", says Mihir V Shah, Executive Director, Vipul Organics Limited.

SHIELDING AGAINST CORROSION

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Quality is never an accident it is always the result of High Intention, Sincere Effort, Intelligent Direction and Skillful Execution.

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