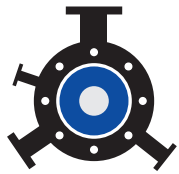


# CHEMICAL ENGINEERING WORLD

www.jasubhaimedia.com



**PTFE LINED SYSTEMS**  
VALVES | PIPES | FITTINGS | COATINGS

www.ptfeindia.com

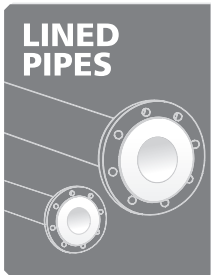
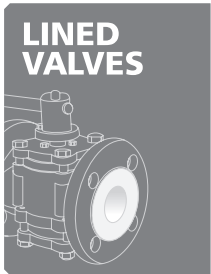
| PTFE | PFA | FEP | ETFE  
| PVDF | ECTFE | PP | HDPE



**APPLICATOR**

a Global Trusted Brand

**YOUR SUSTAINABLE BUSINESS PARTNER**  
IN FLUOROPOLYMER LINED PRODUCTS SINCE 1994



Material options available on customer request from world renowned fluoropolymer suppliers



**HI-TECH APPLICATOR**

1102-B, Phase-3, G.I.D.C. Ind. Estate, Vatva, Ahmedabad - 382 445, Gujarat - India.  
+91 79 4030 7621 / 2583 3040 / 2589 1740 | +91 97370 46491 | hitech@ptfeindia.com



## Process Industry's Gateway to Indian Market



## 31<sup>st</sup> International Exhibition and Conferences

**4-7 March 2024**

Venue: Bombay Exhibition Center, Goregaon (East), Mumbai, India

### Concurrent Events



### Scope for ChemTECH World Expo 2024

- Plant Machinery & Industrial Consumables
- Engineering Consultants
- OEMs for Chemicals & Pharmaceutical Processing Equipment
- Metals & Metallurgy
- Bioprocessing Equipment
- Construction Services Providers
- Plant Maintenance Services Providers
- Logistics & Supply Chain Solutions Providers
- Instrumentation & Process Control
- Industry Automation (Process & Factory)
- Systems Integration & ERP Solutions Providers
- Water & Waste Water Treatment Consultants
- Environment Solutions Providers
- Waste Management Consultants
- Financial Institutions
- Fire & Safety Solutions Providers
- Material Handling Solutions
- Certification Bodies
- Welding Solutions
- Quality Health & Environment Solutions
- Analytical & Laboratory
- Packaging Materials, Machinery & Systems
- Business Consultants

### Scope for Specialty Chemicals World Expo 2024

- Agrochemicals Intermediates
- Adhesives & Sealants
- Agrochemicals & Crop Protection
- Bulk Drugs & Intermediates
- Enzymes
- Colorants, Dyes & Pigments
- Cosmetics & Personal Care Ingredients
- Hygiene & Cleaning Chemicals
- Laboratory Chemicals
- Surfactants
- Water Treatment Chemicals
- Catalysts
- Electronic Chemicals
- Flavours & Fragrances
- Contract Manufacturers

### Scope for Biopharma World Expo 2024

- Materials Processing
- Pharma Ingredients
- Plant Engineering, Process Plants & Equipment
- Laboratory & Analytical Solutions
- Process Measurement & Inspection
- Sterilization & Clean Room Solutions
- Biopharma R&D And Manufacturing
- IT Solutions
- Pharma Machinery
- Water & Waste Treatment Solutions

### FACTS & FIGURES - CHEMTECH WORLD EXPO 2022

**300+** EXHIBITORS | **19350** VISITORS | **20** COUNTRIES | **6** CONFERENCES | **150** SPEAKERS | **650+** DELEGATES | **200** STUDENTS

## Benefits for Exhibitors

- ✓ **Business Interactions:** Meet over 800 exhibitors from across the entire value chain of the chemical process industry
- ✓ **Strategic alliances:** Interact with the entire supply network across the Chemical, Pharma & Biotechnology sectors from a single location
- ✓ **Market analysis:** Evaluate the Indian consumption market and get feedback with over 25,000 visitors walk-ins over 4 days



Organised by:

**Jasubhai Media Pvt Ltd**

Taj Building, 3<sup>rd</sup> Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.

Tel: +91-22-4037 3636 | Email: sales@jasubhai.com

[www.chemtech-online.com](http://www.chemtech-online.com)

Supported by





CHRONICLING PROCESS INDUSTRY INNOVATIONS SINCE 1966

VOL.57 | ISSUE 7 | JULY 2022

# CHEMICAL ENGINEERING WORLD

[www.jasubhaimedia.com](http://www.jasubhaimedia.com)



ChemTECH World Expo 2024  
March 4-7 2024  
Venue: Bombay Exhibition Center, Goregoan (East), Mumbai, India.





# Oil Gas & Power

World Expo 2023

1-3 March 2023

Venue: Bombay Exhibition Center, Goregaon (East), Mumbai, India



Supported by:



Organised by: **Jasubhai Media Pvt Ltd**

Taj Building, 3<sup>rd</sup> Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.

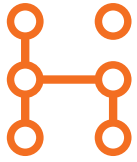
**Tel:** +91-22-4037 3636, **Email:** sales@jasubhai.com

Ahmedabad - 09833104834 | Bangalore - 09892644177 | Chennai - 09176963737

Delhi - 09818148551 | Hyderabad / Pune - 09822209183 | Vadodara - 09820544904



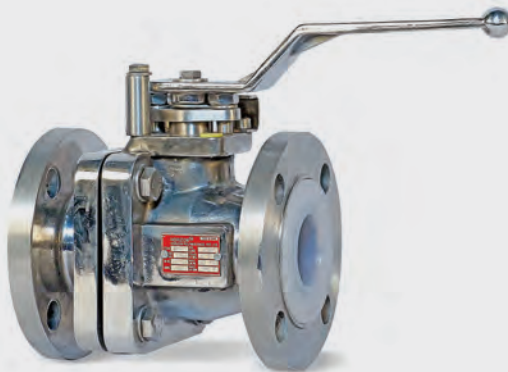
**Jasubhai**  
M E D I A



HORIZON  
POLYMER

[www.horizonpolymer.com](http://www.horizonpolymer.com)

# India's Largest Processor of FLUOROPOLYMERS



Valves qualified  
ISO 15848-Part 1.



Pipework qualified  
ASTM F 1545



Chemours Co FC LLC - Delaware appoints Horizon Polymer as TEFLON® Licensing Partner for India Under Trademark license agreement to promote and sell PTFE/PFA/FEP Lined Piping products using TEFLON® PTFE/PFA/FEP Fluoropolymer.

TEFLON and Teflon diamond brand logo are registered trademarks of The Chemours Company FC, LLC used under license by Horizon Polymer Engineering Pvt. Ltd.

## Horizon Polymer Eng Pvt. Ltd.:

204, Sumer Kendra, Pandurang Bhudhkar Marg, Worli, Mumbai - 400018. India

Contact: +91 22 24965031-36 | Fax: +91 22 24961073

Email: [vp@horizonpolymers.com](mailto:vp@horizonpolymers.com)





# CONTENTS

## INTERVIEW

**Forerunner of a New Green Chemical Revolution 25**



**Nadir Godrej**  
Managing Director, Godrej Industries Ltd

**Envisioning to become the Most Sustainable Infrastructure Company in the World 36**



**Vinayak Pai**  
Managing Director, Tata Projects

## FEATURES

**Implications of Superfund Tax by US on Global Chemical Industry 22**



**Charles Fryer**  
Tecnon OrbiChem founder and senior advisor

**Coal Gasification in Indian Context 50**



**Naveen Ahlawat**  
Chief Procurement Officer & Head-Green hydrogen and Gasification Projects, CCSU Jindal Steel and Power Limited

**Construction Projects -Breakdown of Rates, Quantities, Items, Drawings in a Lumpsum Contract 59**



**Rashid Hussain**  
Author, Advisor, Project Director, Course Director, Lead Tutor, FIDIC Expert, Executive Director 3C

## GUEST COLUMN

**Redefining Chemical Industry's Low-Carbon Future 23**



**Kapil Bansal**  
Partner, Energy Transition & Decarbonization Ernst & Young LLP



**Srivatsa Anchan**  
Partner (Consulting), Ernst & Young LLP

**Future Opportunities for Indian Speciality Chemical Manufacturers 30**



**Rajendra Gogri**  
CMD, Aarti Industries

**Succession Planning in the Chemicals Industry 34**



**Gautam Chainani**  
Advisor, Epsilon Carbon Pvt. Ltd.

**From Pure to Green 48**



**Ajay Popat**  
President, Ion Exchange

**Carbon Emissions and the Importance of Being Earnest 54**



**Rob Jenkinson**  
Net Zero Program Manager, SKF

**Response of Large Scale Industries to Help Small Scale Players 43**



**Suresh Prabhu**  
Member of Rajya Sabha Government of India

**Good Cases for Investment 43**



**B Narayan**  
Group President, Projects & Procurement  
Reliance Industries Ltd.  
Chairman, EPC World Expo 2022

**Need to be as Efficient as China was 10 Years ago 44**



**Subramanian Sarma**  
Whole time Director & Sr. EVP (Energy),  
Larsen & Toubro  
Co- Chairman EPC World Expo 2022

**Universal Transition: No Industry, No Country will be Insulated 44**



**Dr Raman Ramachandran**  
Convener,  
Specialty Chemicals World Expo 2022

**Aiming for Diesel Destruction 45**



**Dr SSV Ramakumar**  
Director (R&D), IndianOil  
Chairman Refining & Petrochemicals  
World Expo 2022

**Multipronged Approach Required 45**



**Sanjay Khanna**  
Director Refineries  
Bharat Petroleum Corporation Ltd

**Proactive Approach will go a Long Way 46**



**R K Srivastava**  
Director Exploration, ONGC Ltd  
Chairman, Surface Engineering &  
Corrosion Control World Expo 2022

**Offshore Infrastructure gets Severely Impacted by Marine Corrosion 46**



**Pankaj Kumar**  
Director Offshore, ONGC

**Bridge the Glaring Gap 47**



**U K Bhattacharya**  
Director Projects, NTPC Ltd  
Chairman Industry Automation &  
Control World Expo 2022

**It is the consumer footprint 47**



**Sudhir Sitapati**  
MD & CEO, Godrej  
Consumer Products Ltd

**CHEMICAL ENGINEERING WORLD**  
RNI REGISTRATION NO. 11403/66

**CHAIRMAN**

Maulik Jasubhai Shah

**PUBLISHER & CEO**

Hemant K. Shetty

**EDITOR**

Mittravinda Ranjan

**SUB-EDITOR**

Radhika Ravindranathan

**CREATIVES**

Arun Parab

**GENERAL MANAGER SALES**

Prashant Koshti  
Amit Bhalerao

**BRAND MANAGER**

Sudhanshu Nagar

**SALES**

Godfrey Lobo  
Priyaranjan Singh  
Chandahas M Amin  
Yonack Pradeep

The Publishers and the Editors do not necessarily individually or collectively identify themselves with all the views expressed in this journal. All rights reserved. Reproduction in whole or in part is strictly prohibited without written permission from the Publishers.

**JASUBHAI MEDIA PVT. LTD.**

**Registered Office:** 26, Maker Chambers VI, 2nd Floor,  
Nariman Point, Mumbai 400 021, INDIA.  
Tel.: 022-4037 3737 Fax: 022-2287 0502  
E-mail: sales@jasubhai.com

**PUBLISHED BY:**



# CHEMICAL ENGINEERING WORLD

## AD INDEX

Hi-Tech Applicator ..... 1

Horizon Polymer Engineering Pvt Ltd ..... 5

## AD INDEX

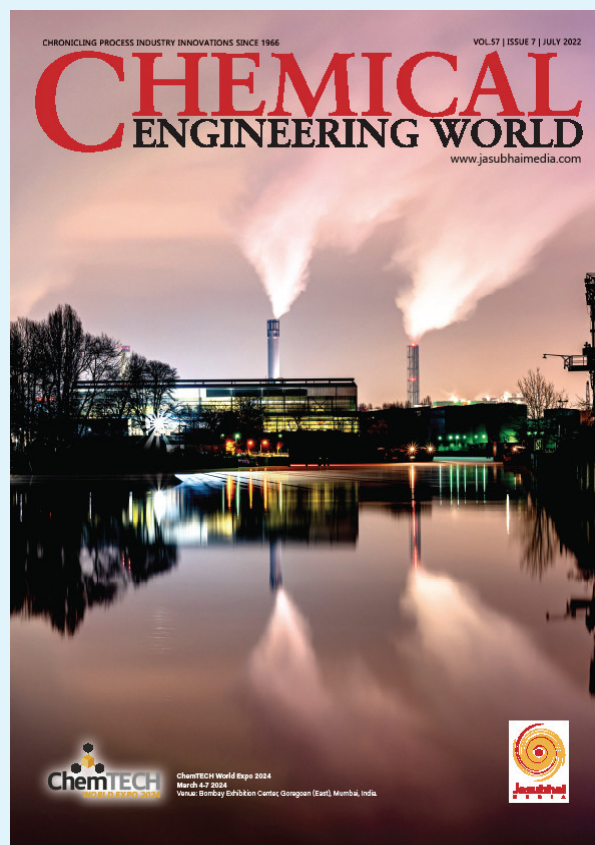
8

## NEWS

9

## PROJECT UPDATES

18



[www.jasubhaimedia.com](http://www.jasubhaimedia.com)



## The Government Targets to Raise Natural Gas Share in Energy Mix To 15% in 2030 from About 6.3%

**New Delhi, India:** The Minister of State for Petroleum and Natural Gas, Shri Rameswar Teli in a written reply to a question in the Rajya Sabha informed that the Government has set a target to raise the share of natural gas in energy mix to 15% in 2030 from about 6.3% now. To achieve the target, various initiatives have been taken which inter alia include the following. Expansion of National Gas Grid to about 33,500 Km from current 21,715 Km, Expansion of City Gas Distribution (CGD) network, Setting up of Liquefied Natural Gas Terminals, Allocation of domestic gas to Compressed Natural Gas (Transport) / Piped Natural Gas (Domestic) in no cut category, Allowing marketing and pricing freedom to gas produced from high pressure/high temperature areas, deep water & ultra-deep water and from coal seams and Sustainable Alternative Towards Affordable Transportation (SATAT) initiatives to promote Bio-CNG.

## Captive & Commercial Coal Blocks Production goes up by 79 % to 27.7 Million ton

**New Delhi, India:** Production from coal blocks during the first quarter of Financial Year 2022-23 was reviewed by the Additional Secretary & Nominated Authority, the Ministry of Coal on 6th July 2022 in the presence of project proponents. Coal production achieved during the first quarter is 27.7 million ton which is 79 % higher than 15.5 million-ton coal produced during same period in FY 2021-22.

The Ministry appreciated the efforts of coal blocks allocattees in achieving such high growth and hopeful that target production of 32 million ton from coal blocks during the second quarter of FY 2022-23 will be achieved. It was also noted with appreciation that two mines auctioned in 2021 under commercial auction reforms have become operational and produced 1.57 million ton in the first quarter.

At present, a total of 36 captive and commercial mines are under production and it is expected that at least 12 more new mines will start production during the year. This will significantly contribute to meet the coal demand in the country.

## Green Climate Fund discussed during GCF Readiness Program



**New Delhi, India:** The Government of India organized a stakeholder consultation workshop on 'Understanding India's Climate Financing needs and its mobilization with focus on Green Climate Fund (GCF)' under the ongoing GCF Readiness Program. The workshop addressed ways of mobilizing finance at scale to facilitate a shift to low

greenhouse gas emission and climate resilient development path, aligned with India's Nationally Determined Contributions under Paris Agreement. The workshop suggested that sustainability path significantly raises the need for finance and human, technological and institutional capacities.

The task of developing a global architecture for trade in credits for emission reductions under Article 6 of the Paris Agreement is assigned to the UNFCCC Secretariat, as per the decisions of Parties to Paris Agreement. The GCF's objective is to support shift towards low-emission and climate resilient development path by providing support to developing countries in the form of grants, loans, guarantees, equity etc. The Government of India has been actively engaging with GCF. So far, 5 projects have been approved with total allocation of USD 514.8 million in diverse areas including water, clean energy, livelihoods and transport. Two projects under GCF i.e., (i) Ground Water Recharge and Solar Micro Irrigation to Ensure Food Security and Enhance Resilience in Vulnerable Tribal Areas of Odisha and (ii) Enhancing climate resilience of India's coastal communities, are being implemented with the active participation of communities in the states of Andhra Pradesh, Maharashtra and Odisha.

## Steps taken to Expedite Environmental Clearance Process

**New Delhi, India:** As per information available on PARIVESH Portal, approximately 172 proposals belonging to various State/UT including one Environmental Clearance (EC) proposal received from the State of Punjab

and three EC proposals from the State of Bihar for grant of EC are being dealt at the Central level. No EC proposal is pending from the District Bhagalpur at central level.

With a view to expedite the EC process, a number of steps have been taken by the Central Government, which includes, Ministry has launched a single window online PARIVESH (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub) portal on 10th August, 2018 which automates the entire process of EC starting from submission of application, preparation of agenda, preparation of Minutes to grant of clearances, EAC meetings for appraisal of projects are now conducted twice a month, Various initiatives have been taken by the Ministry towards necessary amendments in the policies and regulations to ensure transparent and simplified process of EC without compromising on rigor of the environmental concerns.

## 8 Centres of Excellence established in Phase -I of the Scheme for Enhancement of competitiveness

**New Delhi, India:** Department of Heavy Industries which is under the aegis of Ministry for Heavy Industry (MIH) had launched Scheme for Enhancement of Competitiveness in the Indian Capital Goods Sector address the technological obsolescence, limited access to quality industrial infrastructure and common facilities, this scheme encourages technology development through joint participation with Academia, Industry R&D institute and Government and facilitate

transfer/acquiring the critical technologies. The core component of the scheme was establishment of Centers of Excellence (CoEs) which would act as an interface between the academia and industry.

These CoEs were established in two phases. Technology developed by these CoEs & Total Project Cost (TPC) and MHI Contribution for Phase-I CoEs is; I.I.T-Delhi designed and developed robots for data migration from one system to designated system with TPC/MHI-C as 4.6444/3.7146, HCE Ranchi developed 5 cubic meter Hydraulic Excavator-HEX400 with TPC/MHI-C as 6.60/5.28, CMTI-Bangalore developed shuttle less rapiers looms of 450, 550 RPM with TPC/MHI-C as 20/16, IISc-Bangalore developed additive manufacturing machines based on electron beam/plasma/laser tech with TPC/MHI-C as 10.40/8.40, IIT-M was engaged in development of 5-axis multitasking machine, 5-axis Universal Machine Centre, Orbital Motion Mechanism for Abrasive Cutting, Automated Multi-Station Grinding & Polishing Machine, 5kW axis drives and 25kW spindle drives for machine tools, Hydrostatic Systems for Machine Tools, Thermal Compensation Strategy in CNC lathes, Low Cost Machine Tending Robot, Ultra Precision Micromachining Centre and Automation of Grinding Process Intelligence with cumulative TPC/MHI-C as 49.01/39.07, PSG College of Tech developed Automated Welding Systems for Specific Industrial Application, Intelligent Welding Power Supply System with waveform Shaping Techniques, Alloy Design for Welding & Simulation Analysis with TPC/MHI-C as 26.7/21.1, SITRAC-Coimbatore developed Smart Submersible Pumping Solutions for Industrial and Water Supply Applications with TPC/MHI-C as 52.78/37.692.

## 33,500 km Natural Gas Pipeline network has been authorized across the country

**New Delhi, India:** Modernisation of public sector steel were shared namely, Bhilai Steel Plant, SAIL, Bhilai Chhattisgarh, Durgapur Steel Plant, SAIL, Durgapur West Bengal, Rourkela Steel Plant, SAIL, Rourkela Odisha, Bokaro Steel Plant, SAIL, Bokaro, Jharkhand, IISCO Steel Plant, SAIL, Burnpur, West Bengal, Alloy Steels Plant, SAIL, Durgapur, West Bengal. Steel, being a deregulated sector, the decisions regarding modernization and expansion of the various steel plants in the country are taken by the individual public steel companies based on commercial considerations and market dynamics.

Modernisation is a continuous process, last phase of modernization and expansion of the steel plants for Steel Authority of India Limited (SAIL) and Rashtriya Ispat Nigam Limited (RINL) was taken up during 2006-07 to 2018-19. This led to enhancing the capacity of crude steel production from 15.8 million ton per annum (MTPA) to 26.9 MTPA. This includes steel plants of SAIL at Bhilai (Chhattisgarh), Bokaro (Jharkhand), Rourkela (Odisha), Durgapur (West Bengal), Burnpur (West Bengal) and of RINL at Visakhapatnam (Andhra Pradesh). Further, in accordance with the target of 300 MTPA steel production capacity of National Steel Policy (NSP) 2017, modernization & expansion plan to enhance the capacity of crude steel production of SAIL from existing 20.63 MTPA to 35.8 MTPA tentatively by 2030 has been formulated.



## Namitesh Roy Choudhury assumes the role of Vice Chairman and Managing Director for LANXESS India region



12 Namitesh Roy Choudhury, Vice President & MD, LANXESS India region

**Mumbai, India:** Effective July 1, 2022 Namitesh Roy Choudhury assumes the role of Vice Chairman and Managing Director of LANXESS India Private Limited. He also takes on the responsibility of Region Head for India. In this new role, he will represent the businesses of LANXESS India to the global organization and will report to Dr. Anno Borkowsky, member of the Board of Management and head of all the four regions, globally. Roy Choudhury has been the Executive Director since 1 October, 2021 and Vice President, Industrial & Environmental Affairs for LANXESS India since 2007. He moved to the LANXESS India organization in 2004 after the carve out from Bayer as the Head of Production, Technology, Safety & Environment (PTSE) and Capital Investment.

Backed by over 30 years of experience, he has executed several projects at the greenfield LANXESS manufacturing site in Jhagadia, Gujarat, including state-of-the-art ion exchange resins plant for business unit Liquid Purification Technologies, compounding facility for business unit High Performance Materials and relocation of the Rubber Chemicals business and Rubber Compounding facilities. Roy Choudhury is also the Chair of the Indian Bromine Platform (IBP).

## The Plastics Industry May Become a Carbon-Capture Leader, says IDTechEx

One of the major environmental issues facing the planet is the rising levels of plastic consumption and waste. According to a recent OECD study, the world produced 460 million tonnes (Mt) of plastics in 2019 and consumption will continue to rise despite an expected increase in recycling technologies deployment. As carbon dioxide (CO<sub>2</sub>) emissions also soar, the emerging carbon capture and utilization (CCU) industry propose a solution for both issues: creating lower-carbon, degradable polymers using CO<sub>2</sub> emissions as the feedstock. The recent IDTechEx report "Carbon Dioxide (CO<sub>2</sub>) Utilization 2022-2042: Technologies, Market Forecasts, and Players" analyzes the opportunities and challenges of creating this proposed circular carbon economy.

There are at least three major pathways to convert CO<sub>2</sub> into polymers: electrochemistry, biological conversion, and thermocatalysis.

The latter is the most mature CO<sub>2</sub> utilization technology, where CO<sub>2</sub> can either be utilized directly to yield CO<sub>2</sub>-based polymers, most notably biodegradable linear-chain polycarbonates (LPCs), or indirectly, through the production of chemical precursors (building blocks such as methanol, ethanol, acrylate derivatives, or mono-ethylene glycol [MEG]) for polymerization reactions. LPCs made from CO<sub>2</sub> include polypropylene carbonate (PPC), polyethylene carbonate (PEC), and polyurethanes (PUR), PUR being a major market for CO<sub>2</sub>-based polymers, with applications in electronics, mulch films, foams, and in the biomedical and healthcare sectors. CO<sub>2</sub> can comprise up to 50% (in weight) of a polyol, one of the main components in PUR. CO<sub>2</sub>-derived polyols (alcohols with two or more reactive hydroxyl groups per molecule) are made by combining CO<sub>2</sub> with cyclic ethers (oxygen-containing, ring-like molecules called epoxides). The polyol is then combined with an isocyanate component to make PUR. Companies such as Eonic, Covestro, and Aramco Performance Materials (with intellectual property acquired from Novomer) have developed novel catalysts to facilitate CO<sub>2</sub>-based polyol manufacturing. Fossil inputs are still necessary through this thermochemical pathway, but manufacturers can replace part of it with waste CO<sub>2</sub>, potentially saving on raw material costs.

## Manali Petrochemicals inks Commercial Agreement with UK-based Eonic Technologies



Ashwin Muthiah, Chairman, MPL and Founder-Chairman, AM International Holdings

**London, UK:** Manali Petrochemicals Limited (MPL), India's only integrated manufacturer of polyols and a part of the AM International group, announced the execution of the long-form agreement with UK-based based Eonic Technologies. Last year, the companies entered a Memorandum of Understanding (MoU) to introduce more environment-friendly, CO<sub>2</sub>-containing polyols into the global \$28 billion global polyols market.

The signing of the long-form sets the stage for the initiation of the MPL-Eonic partnership. It will comprise a two-year demo scale-up at the 1,300 ltr reactor at the MPL plant 1. The following three years will be spent on industrial scale-up of the technology of MPL's 12,000+ reactors and commercialisation of CO<sub>2</sub>-containing polyols by the company. Congratulating the team, Ashwin Muthiah, Chairman, MPL and Founder-Chairman, AM

International Holdings, said, "Science and innovation will play a key role in ensuring that our manufacturing plants implement eco-friendly and cost-efficient technology. MPL's partnership with Eonic Technologies brings significant R&D-led improvements to the production process. Alongside delivering a greener product to our customers, it reaffirms our ESG commitment towards a carbon neutral planet."

## THINK Gas and ABB India collaborate to commission one of India's first AI-enabled City Gas Distribution Network

**Noida, India:** THINK Gas, one of India's fastest growing companies in the city gas distribution business, has brought ABB on board to deliver a digital solution to maximize efficiency, availability and reliability of its expansive city gas network that incorporates multiple remote terminals across distributed locations in the states of Punjab, Uttar Pradesh, Bihar and Madhya Pradesh.

Harnessing its SCADAventure™ system

deployed in the cloud, ABB has designed a solution that will integrate, monitor and control day-to-day operations across the enterprise, automating workflows to help operators maximize uptime and improve safety. Sitting at the heart of the THINK Gas digital architecture is the ABB Ability™ Genix Industrial Analytics and AI suite, which will bring together multiple sources of real-time data from THINK Gas's operations across its network.

By collating and contextualizing operational, engineering, and transactional data from IT systems, ABB's industrial AI has a significant amount of information and a holistic view of assets and processes, from which it provides better, actionable insights for how to drive performance and efficiency. The system will be managed via a central control room – Nucleus – where operators will be able to promptly retrieve data and convey crucial information, such as operational equipment parameters and consumption trends. Hardip Singh Rai, CEO, THINK Gas said, "At THINK Gas, we are committed to adopt state-of-the-art technology solutions that will help optimize

our network, meet the growing demands in our markets, achieve efficiency and enable us to provide uninterrupted supply of natural gas to our customers. This partnership with ABB marks a cornerstone in our digital transformation journey, that is helping us build THINK Gas into a modern and robust CGD company that is ready for the future."





## Cosmo Films Limited re-brands as Cosmo First Limited



Ashok Jaipuria, Chairman and Managing Director, Cosmo First

**New Delhi, India:** Cosmo Films Ltd, a global leader in Films for packaging, labelling, lamination and synthetic paper and an emerging player in Specialty Chemicals, Polymers & Pet Care today announced its new brand identity, Cosmo First Limited –Ahead always!

The strategic decision comes considering the company's business activities have expanded beyond films into specialty chemicals (master-batches, coatings, and textile chemicals) and D2C Pet care. The rebranding reiterates the value of Cosmo and strengthens its focus to create a better life for the people, the world, and the community we live in; built on Trust, Empathy, and Compassion. Cosmo First Limited stands for four-decade young

Indian business conglomerate that thrives on innovation to unlock value in diverse sunrise sectors such as Polymer, Speciality Chemicals and D2C Pet Care.

Talking about the rebranding, Mr. Ashok Jaipuria, Chairman and Managing Director, Cosmo First said, "Cosmo at its core has always been pioneering revolutionary innovations to create a better life. All through our journey, we have prided ourselves in our ability to provide industry-first niche solutions in the areas of packaging, lamination, industrial and labelling applications. We have made inspiring diversifications into speciality chemicals, consumer care, and D2C retail, aiming to be a pioneer in these previously fragmented industries." "We would like to be the first choice for all our stakeholders and will strive hard to always stay ahead of the curve to provide industry first solutions," he added.

15

## Anupam Rasayan India Limited Reports Q1FY23 Results

**Anupam Rasayan India Ltd**, one of India's leading custom synthesis and specialty chemical player, has announced its financial results for the quarter ended June 30, 2022. Financial Highlights for Quarter Ended June 30 th, 2022: Operating Revenues at ₹3,066 million in Q1FY23 as compared to ₹2,337 million in Q1FY22 – growth of 31% Y-o-Y. Total Revenues at ₹2,971 million in Q1FY23 as compared to ₹2,380 million in Q1FY22 – growth of 25% Y-o-Y. EBITDA (incl. other revenue) at ₹845 million in Q1FY23 as compared to ₹650 million in Q1FY22 – growth of 30% Y-o-Y. Profit After Tax at ₹397 million in Q1FY23 as compared to ₹321 million in

Q1FY22 - growth of 24% Y-o-Y.

Anand Desai, Managing Director of Anupam Rasayan, commented, "I am happy to inform you that, we delivered robust growth in Q1FY23 against the backdrop of an uncertain global environment. Our operating revenue grew by 31% on a year-on-year basis. Our focus on financial prudence and operational finesse has helped us keep our margins at sustainable levels. During the last financial year, our ability to ensure continuous supply to our customers has resulted in customers revising their volume guidance upwards for the current financial year along with the increase in price of these products. Tanfac integration is progressing smoothly with the successful integration of key areas like Finance, IT, and HR and I am happy to share that we have successfully expanded the capacity of certain Tanfac products with process improvement and debottlenecking. Overall, I believe we have an exciting year ahead of us and we at Anupam are all geared up to deliver strong sustainable growth in FY23.

## **BASF doubles its polymer dispersions capacity in Dahej, supporting fast-growing industries in South Asia**

**Dahej, India:** BASF completed the installation and startup of a state-of-the-art acrylic dispersions production line in Dahej, India, serving the coatings, construction, adhesives, and paper industries for the South Asian markets. BASF began production of polymer dispersions in Dahej, India in October 2014, and this additional production line will almost

double its capacity. BASF is one of the leading producers and suppliers of acrylics and butadiene containing dispersions in the Asia Pacific region. "As a global supplier for polymer dispersions, we are committed to ensuring the supply of high-quality products, supporting our customers' expansion plans.

The new production line complements the existing setup and allows the production of new dispersions technologies under Styronal® PLUS 7918, Styronal® ES series, Basonal® FCB, Acronal® EDGE, Acronal® PLUS, and next-generation Acronal® ECO product ranges. "In construction polymers and architectural coatings, our innovations continue to deliver increased functionality including sustainability features, as well as durability improvement, driving premiumization of the industry. For instance, our DURA-COLOR binders for exterior coatings enable formulations of exterior paints with outstanding dirt pick-up resistance and color retention. In paper coatings for example, we continue to drive improved cost-in-use solutions. Styronal® PLUS 7918 is our high-strength product that allows a substantial reduction of binder usage," said Bir Darbar Mehta, Senior Vice President of Dispersions Asia Pacific, BASF. "Dispersions is an important business for us in India, and this project reflects our commitment to the Indian market and our customers in the country," said Narayan Krishnamohan, Managing Director, BASF India Limited and Head of BASF Group Companies in India. The site in Dahej, Gujarat is an integrated hub for polyurethane manufacturing which houses production facilities for polymer dispersions as well as care chemicals.

## Project Air: Unique Swedish green chemistry investment wins support from EU Innovation Fund

The European Union Innovation Fund has selected Project Air, a unique production facility for sustainable methanol in Stenungsund, Sweden, as one of 17 large-scale green tech projects to be granted more than EUR 1.8 billion. Project Air, which is a collaboration between Perstorp, Fortum and Uniper, has applied for EUR 97 million and the total investment is expected to amount to more than EUR 230 million. Project Air is a gamechanger for the chemical industry, moving from fossil raw materials to recycled and bio-based feedstock, thereby enabling sustainable chemical products to a large variety of industries and end products. At full capacity, it will reduce global CO<sub>2</sub> emissions with close to 500,000 tons from today's levels, corresponding to 1 percent of current emissions in Sweden. "The Innovation Fund's decision shows that Project Air is an important future investment for the climate. This is a crucial decision for Perstorp, our customers and partners, as it creates increased availability of sustainable chemical products throughout our value chains. The chemical industry needs the carbons, but it must be non-fossil carbons and they must be put into circular flows so we get rid of CO<sub>2</sub> in the atmosphere," said Perstorp President and CEO Jan Secher. "I am proud to be the leader of a company that has the ability to drive such an industry leading transformation project." Project Air is based on innovative usage of existing technology in a large-scale industrial application.

To produce sustainable methanol, the facility utilizes significant amounts of CO<sub>2</sub> and other residue streams recovered from Perstorp's ongoing operations, biogas from new dedicated plants together with hydrogen from a new large electrolysis plant. Further, existing wastewater treatment will be utilized as feed water for the electrolysis. All electrical energy for the combined project will be renewable based. The ambition is to start up large-scale production by 2026. Project Air will be built at Perstorp's existing facilities in Stenungsund, strengthening the regional chemicals industry cluster, Hållbar Kemi 2030. The sustainable methanol from Project Air will be used to produce chemical products which in turn are used in a variety of applications in several industries and businesses. ■



## Samsung Engineering bags a 680 mil USD EPCC contract from Shell in Malaysia



Sungan Choi, President and CEO of Samsung Engineering

Samsung Engineering, one of the world's leading Engineering, Procurement, Construction and Project Management (EPC&PM) companies announced to have received an Engineering, Procurement, Construction and Commissioning (EPCC) USD 680 mil contract from Sarawak Shell Berhad (SSB), for its OGP (Onshore Gas Plant for Rosmari Marjoram) project in Bintulu, Sarawak, Malaysia. The project shall be executed in two phases; a limited scope prior to SSB obtaining its FID for the Rosmari Marjoram project; with all of the rest of its scope to be executed after SSB obtains FID.

The OGP plant will have the capacity to process up to 800 million cubic feet of gas per day. Samsung Engineering will execute the OGP project on an EPCC (engineering, procurement, construction and commissioning) basis. The OGP project's RFSU (Ready for Start-up) is expected to be accomplished by the end of 2025. Samsung Engineering was able to receive this contract after competing and successfully emerging as the successful bidder from the dual Front End Engineering and Design (FEED). Samsung Engineering has a distinguished track record of gas projects in Malaysia and is currently working on the Sarawak Methanol Project and developing the H2biscus Green Hydrogen/Ammonia project in Sarawak.

Sungan Choi, President and CEO of Samsung Engineering said, "Track record, regional expertise as well as sustainable investment in Sarawak, combined with our strategy to participate from FEED stage and roll over to execute a total solution in EPCC, proved to be the right strategy, so that Shell entrusted us with their OGP project in Sarawak. We're gratified and honored to deliver a modern, sophisticated and premium Onshore Gas Plant for Shell in Sarawak." Samsung Engineering shall further explore business opportunities by accumulating experience in the gas market and further will continue securing additional experiences in executing a FEED to EPC conversion

projects. Samsung Engineering will also look to grow its future participation in additional FEED as well as EPC projects in Malaysia. Samsung Engineering is prepared to become a “Beyond EPC, Green Solution Provider” for a better future.

### **JSW Steel allots 10,000 crore for carbon emission reduction initiatives**

JSW Steel has allocated Rs 10,000 crore to reduce carbon emissions through various initiatives. The company also targets to reduce carbon emissions by 42 percent by 2030. The company has contracted for about one GW of renewable energy, of which 225 MW became operational in April 2022, and the remaining will come on stream in phases.

The investments to reduce carbon emissions would be done through various initiatives, such as increasing the use of renewable energy to replace thermal power, reducing fuel rate through improved raw material quality via beneficiation, and with best technologies. Moreover, the group is also planning to increase the steel capacity from 27 million tonnes to 37 million tonnes by 2024-25.

### **Arvee Speciality Chemicals to set up API unit in Mahesana**

Arvee Speciality Chemicals is planning to set up active pharmaceutical ingredients (API) at its intermediates manufacturing unit at Bhalthi in Mahesana district of Gujarat. The project will spread over 9.67 acre of land parcel. The unit will have a capacity of 500 tpm. Arvee Speciality Chemicals has received environment clearance from the State Environment Impact Assessment Authority (SEIAA), Gujarat. ■

# Implications of Superfund Tax by US on Global Chemical Industry

**I**n 2022, US President Biden finally got consent from Congress to reintroduce an old tax created to generate funds for the clean-up of sites and environments impacted by past chemicals industry activity – the Superfund Tax. Taxable chemicals and compounds now number around 150 more than in the previous version. And the resurrected levy rates have effectively doubled compared to the original Superfund Tax that expired in 1995.

For the US companies importing these chemicals and substances however, it is not so much the additional cost – though certainly unwanted – that is proving problematic. To those affected, it is how to assure compliance that is proving most unsettling. Suppliers and exporters to the US, therefore, will do well to be mindful of the tax's burdens and proactive in providing detailed and timely information. US buyers may need additional clarification in order to pinpoint substances that may be subject to levies upon entering US territories.

## Chemicals captured in the tax

The measure distinguishes between 'Taxable Chemicals' and 'Taxable Substances'. For a manufacturer or distributor exporting to the US, it is important to know that the chemicals the new rules denote as Taxable Chemicals include the hydrocarbons: acetylene, benzene, butane, butylene, butadiene, ethylene, naphthalene, propylene, toluene and xylenes. Those chemicals are charged at a fixed rate of USD 9.74/short ton (s.ton) – with methane charged slightly lower.

Besides those 11 key organic chemicals are 31 inorganic chemicals, which are taxable at varying levels – though we are not covering the inorganic chemicals in this article. We note, however, that the full list includes chlorine and ammonia, which has implications for some organic chemical derivatives. Any chemical product that is imported into, the US, and is on the list of Taxable Substance, is liable to tax in relation to the extent of use of the Taxable Chemicals in its manufacture.

The reinstated infrastructure act's Taxable Substances strand is a key component of



the excise tax. As companion to the main tax, it means that imports are liable to the tax and thereby it closes a loophole for avoidance. Initially a list of around 50, its newest iteration – with the issue of Notice 2021-66 – expanded it to over 150 (for the moment). The import of taxable chemicals made offshore will be subject to the tax, but so too will import of their derivatives if they are on the Taxable Substances list, which will thwart any attempts by importers to circumnavigate the tax by switching to a derivative.

## Calculating composition

As stipulated in the original Superfund Tax, to qualify as taxable, a substance had to be made up of more than 50% of a taxable chemical. In its reinstatement however, that ratio has been adjusted to a qualifying threshold of 20%. It can be seen as a caution that for monoethylene glycol (MEG) – a Taxable Substance in the new legislation – consideration of composition will need to be ongoing to be fully confident of adherence. 'That's because the quantity of ethylene to make one ton of MEG is 0.452 tons stoichiometrically, but 0.60 tons in practice due to losses in production.' Modern plants and newer processes, says Fryer, can achieve a lower figure than 0.60 tons, which is an average.

'We do not know which of these two figures will be accepted by the Inland Revenue Services (IRS) but let us suppose that the practical figure will be taken.' In that case each s.ton of MEG imported

will be subjected to a levy of  $\text{USD } 9.74 \times 0.60 = \text{USD } 5.84$ . Imports are measured in metric tons, equivalent to 2204.6 lbs, so the levy per metric ton will be  $\text{USD } 5.84 \times 2204.6/2000 = \text{USD } 6.44$ .

## By-products uncertainty

The position with regard to by-products is uncertain. Production of one ton of MEG entails the co-production of about 0.10 tons of higher glycols (DEG, TEG, etc.). So, to produce one ton of MEG a total of 0.64 tons of ethylene has to be fed to the plant. 'To maximise the tax take the IRS may insist that it is the feed of ethylene that counts, irrespective of what by-products emerge (especially since DEG and TEG are not on the taxable substances list). The levy per metric ton of MEG in that case comes to USD 6.87.' Fryer adds.

On the 'follow up list by the IRS we find that PET resin is included as a Taxable Substance. One ton of PET needs 0.33 tons of MEG for its production. This means that imported PET is subject to a levy of  $\text{USD } 5.84 \times 0.33 = \text{USD } 1.93$  per s.ton or USD 2.13 per metric ton on account of its MEG content (rising to USD 2.26 per metric ton taking account of the by-product effect). In addition, PET needs 0.87 s.tons of PTA for manufacture of one s.ton, and one s.ton of PTA in turn needs 0.67 s.tons of PX. This means that imports of PET have an additional levy of  $0.87 \times 0.67 \times \text{USD } 9.74 = \text{USD } 5.68$  per s.ton or USD 6.26 per metric ton coming from its PTA content. Taking MEG and PTA together,

one metric ton of imported PET will be subjected to a superfund levy of USD 2.13 + USD 6.26 = USD 8.39.

But another complication emerges. Making one ton of paraxylene (PX) requires consumption of 1.25 tons of mixed xylenes (a variable figure depending on the process). If the IRS insists that the feed of xylenes is the relevant factor, the levy per metric ton of PET due to the total xylenes input goes up to USD 7.83. Taking both of the higher figures for MEG and PTA and combining them, one metric ton of imported PET will be subjected to a superfund levy of USD 2.26 + USD 7.83 = USD 10.09. Clarification from the IRS on methodology of the calculation will be needed to determine the precise figure.

### Costly errors

Although the actual payable tax figures are fairly low compared to the overall cost per ton of product imported, the danger comes from miscalculation. Failure to comply will incur a default rate penalty of 10% of the appraised value of the substance. Taking recent domestic and import US prices of PET, failure to report to the IRS would result in a penalty charge approaching USD 200 on a metric ton basis (rather than USD 10.09 – worst case – in our example above for compliance).

### Work in progress

The IRS has the authority to calculate and decide how it would determine the

tax rate on these substances based on its calculation or information it obtains on the chemical composition of these substances. Similarly, taxable substances may be added or removed from list, according to IRS-issued guidance from June 2022.

To some extent, it is that lack of certainty that is creating the biggest problem for importers and exacerbating fractious logistical environments. Even as late as June, US acetic market participants said the process for handling the new tax was not fully understood. This was even apparent even within large companies that are used to dealing with complex financial issues, according to Tecnon OrbiChem sources. That confusion provides opportunity. Exporters can not only demonstrate understanding but be ready and willing to provide insight on compositions and knowledgeable of composition alterations that may impact how the tax should be calculated by the importer. ■



### Author

**Charles Fryer**

Tecnon OrbiChem founder and  
senior advisor

# Redefining Chemical Industry's Low-Carbon Future



## Kapil Bansal

Partner, Energy Transition & Decarbonization  
Ernst & Young LLP

**G**lobally, the chemical sector is the largest industrial consumer of both oil and gas. It is also the third largest industry sub sector in terms of direct CO<sub>2</sub> emissions – behind iron & steel and cement. Approximately 50% of the sector's energy input is consumed as feedstock, the emissions of which are released downstream in other sectors. The industry's GHG emissions come primarily from two sources. One is the significant amount of energy needed to break reform chemical bonds; about half of the industry's emissions are from burning fuel



## Srivatsa Anchan

Partner (Consulting), Ernst & Young LLP

to produce the steam, heat and pressure used in that process. The other source is the carbon dioxide, nitrogen oxides and other GHGs generated in the chemical reactions themselves, which account for the other half of industry GHG emissions.

## Indian Chemical Industry

The chemical industry of India contributes more than 7% of the country's GDP. Sixth largest in the world and third in Asia, the chemical industry in India was valued at approximately US\$ 100 billion in 2019. Currently, it is nearly US\$ 180 billion and expected to more than double by 2025.



The industry can broadly be classified into three categories basis the end products –Basic organic chemicals, Inorganic chemicals, and Specialty chemicals. It is an energy-intensive sector, with significant usage of natural gas in fertilizer production, power usage in chlor-alkali and leaving aside the usage of natural gas as feedstock in key processes for ammonia production. As the shift towards decarbonization and net zero emissions is underway, several chemical companies in the country are interested in adapting to the changing times. However, formidable technical and economic barriers come in the way.

## Net Zero Emissions plans

### ▪ Tata Chemicals: A case in point

Tata Chemicals operates multiple manufacturing units across India, USA, UK, and Kenya. As part of its sustainable practices, it has identified abatement levers, as well as low-carbon growth and carbon-offset opportunities. The company has also introduced energy savings schemes at its plants has been instrumental in reducing its sites' carbon footprint. It is one of the few chemical players and the only Indian chemical company that has signed up for the Science Based Targets initiative (SBTi) under the climate-change initiative. Tata Chemicals has also developed a strategy to reduce carbon emissions by 30% by 2030 and adopted shadow carbon pricing for reviewing its CAPEX and ensuring carbon-conscious growth.

**Tata Chemicals is one of the few chemical players and the only Indian chemical company that has signed up for the Science Based Targets initiative (SBTi) under the climate-change initiative. Tata Chemicals has also developed a strategy to reduce carbon emissions by 30% by 2030 and adopted shadow carbon pricing for reviewing its CAPEX and ensuring carbon-conscious growth**

### ▪ Ammonia Production: One of the target chemical products

India is one of the largest ammonia producers in the world and has more than 20 fertilizer plants. Some of the largest ammonia plants in India are Jaypee fertilizers and industries Kanpur ammonia plant, KRIBHCO Hazira ammonia plant, Indo Gulf fertilizers and chemicals Jagdishpur ammonia plant etc. And India is set to have large capacity additions – aiming at the country's increasing fertilizer demand and reducing its dependence on imports. Ammonia is not only vital from the global food security context but also a basic building block for a range of chemicals, from pharmaceuticals to refrigerants. In addition, its versatility can be extended to the renewable transportation sector, and it can be used as a medium for energy storage, both of which are key factors in meeting sustainable development and climate

neutrality goals.

Ammonia is produced by synthesis of hydrogen and nitrogen, and its production is one of the biggest GHG emitters in the Indian chemical industry. Typically, the hydrogen is produced via a process called steam reforming, in which high pressure steam reacts with natural gas or fuel oil. The process is very energy intensive, requiring up to 25 bar of pressure and temperatures of up to 1000o C. In addition, reformers also emit carbon monoxide, carbon dioxide and nitrogen oxides from reactions and fuel combustion.

Fortunately, many of the technologies required to significantly reduce GHG emissions in ammonia production are already available and have been successfully piloted for commercial use. These include carbon-free hydrogen production via electrolysis of water and generation of heat and pressure based on renewable energy.

However, modifying existing ammonia plants implies modifying their core units, which would require huge CAPEX. The modification of a plant would take between 12 and 18 months, resulting in high standstill costs. In addition, the new technology will be more expensive to run, implying that the shift to net-zero emission ammonia would increase operating costs significantly.

## **Decarbonization Pathways and Associated Pitfalls**

At present, there are two broad routes

to decarbonizing the chemicals industry bio-based and green hydrogen. The exact role that bio-based feeds and hydrogen play varies by product and processes, but both routes are more viable than cracker electrification for example. However, the biggest challenge with both bio-based and green hydrogen routes is cost parity.

Green hydrogen is nowhere close to being competitive vs 'grey' hydrogen or even 'blue' hydrogen for that matter in the short term. Green hydrogen costs are expected to reach parity with grey by 2030 driven by declining costs of renewable power and growing economies of scale in electrolysers.

On the other hand, the bio-based route also has cost challenges. In addition, it also has complications around scale. However, the major difference is that there is increasingly emerging evidence of both cost parity and scale in the case of bio-based route. Some global players are expected to have a world-scale, cost-competitive and carbon-negative materials unit up and running as soon as by 2025. Bio-based routes using engineered organisms have the additional benefits from syn-bio platforms that continue to drive down costs and improve strains. Therefore, it is believed, that even though hydrogen is more versatile, bio-based chemicals will likely be commercial at scale earlier than the hydrogen-based chemicals.

Ultimately, decarbonising a sector as diverse as chemicals is not about

one solution or the other. It is going to require a whole host of solutions – from electrification to bio-based feedstock and hydrogen, as well as multiple.

recycling and circular techniques from mechanical recycling to pyrolysis. Novel technologies such as microwave plasma methane splitting, direct carbon transformation, etc. could also end up playing a part in decarbonising the value chain.

### Way forward & Conclusion

While the potential exists, there is a two-fold focus required to make decarbonization a reality in the chemical industry.

- The need of the hour is an eco-system of producers and refiners along with an equitable policy framework that ensures global access to metals and elements necessary for processes as the intent is to replace carbon and oxidation chemistry with electro-chemistry.
- A comprehensive and structured framework for the sector and its segments is needed to enumerate the carbon quotient and dependence for feedstock and energy in chemicals and phase-wise approach (with regulatory incentives) to substitute fossil fuels with low/ no carbon alternatives in the chemical production process.

Further, the following stepwise methodology could enable the chemical

**Tata Chemicals is one of the few chemical players and the only Indian chemical company that has signed up for the Science Based Targets initiative (SBTi) under the climate-change initiative. Tata Chemicals has also developed a strategy to reduce carbon emissions by 30% by 2030 and adopted shadow carbon pricing for reviewing its CAPEX and ensuring carbon-conscious growth**

industry players to cut down on emissions and improve their ESG performance.

- Defining sustainability strategy and objectives
- Sustainable Financing options
- Sustainable R&D portfolio management
- Supply base decarbonization across scope 1, scope 2 and scope 3 emissions
- Asset decarbonization
- Implementing sustainability enablers across the value chain – Governance, Capability building and Digital/ Technology initiatives

This will not only ensure decarbonization in other sectors through presence of low-carbon chemicals but also ensure the sustenance of chemical industry's low-carbon future. ■



## Forerunner of a New Green Chemical Revolution



**Nadir Godrej**

Managing Director, Godrej Industries Ltd

*Mr. Nadir Godrej gets into a conversation with Chemical Engineering World, gives an overall insight about Godrej Industries' sustainable growth points, his enthusiastic vision for green growth, and shares a moving poem about carbon tax.*

### **How is your organization responding to the new world order to urgently address climate change?**

In 2010, we started our Good and Green Program throughout the group to achieve social and environmental sustainability. We set out to be carbon, water and solid waste neutral by 2020 and gave vocational training to 1 million people. During the pandemic, we could not be totally neutral but we hope to achieve it by 2025 for

Scope 1 and Scope 2 emissions. In 2014, we joined the WBCSD (World Business Council of Sustainable Development). I gave a speech at their meeting in Paris in 2015 in conjunction with COP 21 in Paris.

“We have now adopted Science Based Targets and started measuring our Scope 3 emissions. We plan to work closely with our suppliers to reduce our carbon, water and solid waste footprints (with a special emphasis on plastics). Energy efficiency

was the first step. By reducing waste we reduce our footprint as well as costs. We do invest but the returns are well over the cost of capital. We source solar and wind energy for our operations and now the rates are well below the exorbitant rates charged by the utilities saddled with having to provide free and subsidised power to various stakeholders. We also use biomass sourced from outside or from our captive byproducts such as Palm fibre, empty Palm fruit bunches and Palm Kernel shells. We are India's largest producer of Palm Oil and all the energy in our Palm Oil mill is derived from the byproducts produced at the mill. Other factories source biomass from other industries such as bagasse and groundnut shell powder. These efforts reduce our Carbon footprint."

After we started Good and Green in 2010, Corporate Social Responsibility was subsequently mandated at 2% of net profit. This money is spent on social and environmental causes. One such activity is watershed development. This is very cost-effective and the water conserved provides livelihoods to many farmers. The benefits are several times the costs. It also provides us with both water and carbon offsets. The additional farming activity and tree planting in the watershed areas sequester significant quantities of carbon. In India, crop residues are burnt before the next planting. This results in terrible pollution and carbon emissions. We plan to use CSR funds to mulch these wastes or use them as biomass fuel. All in all, we feel

## Carbon Tax

By Nadir Godrej

*A uniform carbon tax  
Would protect all our backs.  
Collected by each Nation state  
But universal in its rate!  
All GHGs would be fair game.  
Every country should charge the same.  
The benefit that this would yield  
Would be a level playing field.  
Competitors just wouldn't care  
Because this system's very fair.  
Just how high should this tax be?  
A range of numbers we can see.  
But Sixty dollars per metric ton  
Would surely get reduction done.  
For carbon this could be the rate  
For others we would calibrate.  
The appropriate rate we would select  
Based on the Greenhouse Gas effect.  
Based on today's emissions rate  
Quite candidly I should state  
It wouldn't be a trivial sum  
But there's no reason to be glum.  
In dollars it would be Two Trillion  
It is a lot but not a Zillion!  
Compared to global GDP  
The percentage is less than three.  
Compared to taxes then again  
The percentage is less than ten!  
Of course some would then take a call  
To reduce emissions not pay it all.  
But bear in mind it's not a cost.  
For the economy nothing's lost.  
A UBI could be instated  
Some other tax could be rebated.  
And if this is indeed so  
The economy would still grow.*

confident that we can achieve neutrality without affecting profits by intelligently using CSR. In our Oleochemical business, most of our raw materials are plant-based and we aim to reduce the salience of fossil fuel-based raw materials.

**What are some of your organization's opportunities in the near, foreseeable future and key focus areas for business?**

The Chemical industry has done very well in India in the last few years. The pandemic disrupted Chinese supply chains and India proved to be a viable and reliable alternative for some products.

We plan to expand all our Chemical Businesses, Petrochemicals, Speciality Chemicals and Agrochemicals. We are setting up a new Agrochemical R&D center, stepping up R&D investments and partnerships in all our businesses. Sustainability is a large focus and as we have an agribusiness we want to improve our linkages with farmers who produce our raw materials. We are focusing on improving the yield and quality of both rape seeds and Oil Palm. We are looking at both byproducts and cultivated biomass. Bamboo is a promising alternative ideally suited to India. With affordable biomass, cellulosic ethanol is viable. Green ethylene produced by dehydration of ethanol enables the replacement of many petrochemicals with identical green alternatives.

We hope to be at the forefront of this new

**We are focusing on improving the yield and quality of both rape seeds and Oil Palm. We are looking at both byproducts and cultivated biomass. Bamboo is a promising alternative ideally suited to India. With affordable biomass, cellulosic ethanol is viable. Green ethylene produced by dehydration of ethanol enables the replacement of many petrochemicals with identical green alternatives.**

green chemical revolution. We also plan to explore producing green hydrogen from biogas reforming or electrolysis using solar, wind or biomass-based electricity to produce simple green chemicals such as methanol, formic acid and ethanol. I look forward to the complete disruption of fossil fuel and fossil material economy.

**How is your organization preparing for future sustainable growth?**

The organization is well positioned for green growth. The commodity boom and high fossil fuel prices will ensure that fossil fuels will become obsolete. Especially if carbon taxes are introduced. This will ensure that green raw materials are cheaper than fossil fuels. ■



# Future Opportunities for Indian Speciality Chemical Manufacturers



30

## Rajendra Gogri

CMD, Aarti Industries

**D**uring the last two decades, a significant shift has been observed in the global speciality chemicals industry, with emerging markets, particularly Asia, gaining production supremacy over developed countries. The key drivers of this shift include cost advantages in emerging markets with respect to equipment costs, logistics, labour etc. in western countries.

### India's stance in the speciality chemical market

Many global companies are seeking to optimize their supply chain and exploring

opportunities to shift closer to the demand centers. Within Asia, a significant business opportunity exists for Indian manufacturers, as global corporations are striving to minimize the risk by reducing their dependency on China. In India, the per capita consumption level of speciality chemicals is far below the global average, which provides significant opportunities to the Indian chemical industry. Rapid urbanization and a growing young population with disposable income will convert into rising demand for end-user industries such as food processing, personal care and home care further adding to the speciality chemical sector's

growth.

At present, approximately 30% of India's chemical requirements are met by imports indicating that there is an ample opportunity for import substitution and the Government's push towards building an Aatmanirbhar Bharat (self-reliant India) is aiding this growth. India accounts for approximately 4% of the global share of manufacturing speciality chemicals. The growth is expected to be led by sustainable demand in end-user industries. India's exports of chemicals hit a record at US\$ 29 Bn. in FY22 from US\$ 14 Bn. in FY14. In less than a decade's time, the industry has already seen over 100% export growth, with potential to grow much more.

The specialty chemicals account for a major share of more than 50% of chemical exports, dominated by agrochemicals, dyes, pigments, etc. Our export achievements indicate that the chemical industry has improved its competitiveness and established a strong presence in the global market driven by low-cost manufacturing, availability of skilled workforce, reputation for IP protection and strong process optimisation capabilities.

### **Building resilience as an emerging market**

Factors like competitive advantage due to the reduction in corporate taxes, PLI scheme for various downstream industries, 100% FDI in the chemical

**Now is the most favorable time to focus on the growth of next-generation businesses such as Electronics, IT, Telecommunication (5g), Electric Vehicle, Smart Mobility, etc. These industries use a broad range of highly sophisticated speciality chemicals which are currently not being produced in India.**

sector through automatic route, the PCPIR policy, other schemes promoting Make in India and significant improvement in Ease of Doing Business also indicate a bright future for the Indian chemical industry at least for the next decade. The domestic industry is strong enough in segments like Agrochemicals, Active Pharma Ingredients, Dyes & Pigments, etc. However, for driving sustainable growth in the speciality chemicals industry, companies need to invest in other higher value-added opportunities. Now is the most favorable time to focus on the growth of next-generation businesses such as Electronics, IT, Telecommunication (5g), Electric Vehicle, Smart Mobility, etc. These industries use a broad range of highly sophisticated speciality chemicals which are currently not being produced in India. Therefore, it is important to understand the key end markets and emerging trends where technical and market know-how can be combined with economies of scale

to drive higher margins.

As an industry, our target is to reach USD 300 Bn. by FY25 and this can be achieved with a growth of approximately 10% CAGR for the next few years. The untapped export potential of the Indian chemical industry is worth USD18 Bn. To grab the export opportunities and achieve our targets, there is a need to significantly boost our domestic production. We need to quickly upgrade our existing ports, warehouses, feedstock storage facilities, pipeline networks for raw material supply, deep sea-discharge lines, quality testing and certification centers, etc.

## 32 **Developing solutions with targeted approach**

The Government, in partnership with the private sector, needs to work on the creation of an all-India mapping of various linkages impacting the chemical sector. This could include mapping of warehouses/ storage facilities, ports and refineries to pipelines, linkages of factories to the common effluent treatment plants, power, utilities, etc., which can serve as a ready reckoner for any domestic or foreign entity seeking to set up a greenfield project. The system can be further integrated with the National Single Window System and India Industrial Land Bank (IILB) GIS-based portal to provide a holistic view related to approvals, connectivity, infra, natural resources & terrain, plot-level information (on vacant plots), line of activity, and contact details.

While considering greenfield and brownfield projects, land availability is one of the issues faced by the industry. This issue can be addressed by developing the existing PCPIRs and also notifying more Industrial Development Corporation areas/clusters in the State of Gujarat and Maharashtra. We also need to have a targeted approach to attract FDI by MNCs. Apart from that, the sector requires continuous R&D and innovation to stay competitive in existing products and also to develop new ones. R&D excellence is imperative to sustain and achieve long-term growth. To drive growth, the Government of India needs to incentivize R&D and innovation. The earlier R&D incentive of weighted tax deduction of 200% can be reinstated for the next 5 years.

The Government of India may also announce a "First in India" scheme for products not produced in India for the last ten years. Additionally, the Govt. of India may take necessary steps to utilize industry's CSR funds for Research and Development activities at recognized academic and/or National Research Institutions. The collective CSR funds can be channelized through an entity - preferably reputed Industry Associations to fund the research and innovation activities. The Intellectual Property Rights for any development can be retained by the research institution, to be licenced to the domestic industry at nominal charges.

For technology advancement, the Amended Technology Upgradation Fund Scheme which facilitates improvements in investment, productivity, quality and exports in the textile industry through technology upgrades can be replicated in the chemical sector as well.

Sustainability is a key operating factor in the chemical sector, hence, matters of Safety, Health and Environment form the primary focus and a Process Safety institution to support new practices/ technologies is essential. Development and wide circulation of Standard operational safety guidelines along with process safety guidelines is important and it will help the MSME players to adopt the best practices for sustainable growth.

### **Way ahead for the growing industry**

Our industry is one the most skill-intensive industries and we are experiencing an alarming shortage of skills calling for an improved effort on this front. The chemical industry struggles to attract young professionals owing to various reasons such as lack of understanding about career opportunities, growth prospects, requisite skill sets, poor brand image, negative perception of chemical applications/ end-uses etc. Therefore, to attract young talent, it is crucial to organize nationwide awareness programs and highlight the importance of Chemicals in our daily life and their vital contribution

to nation-building. Apart from industry-academia collaboration, set-up of central institutes (like CIPET) dedicated to the chemical industry is also essential.

The Govt. of India has taken a series of developmental reforms and initiatives. The Department of Chemicals and Petrochemicals, with recent initiatives such as Chintan Shivir and Perspective Plan for Chemical Industry is all set to enable much-needed guidance for long-term growth. The triple growth drivers such as increasing domestic demand, room for import substitution and expanding export opportunities, are expected to aid the Indian speciality chemicals market to grow at a CAGR of 10–12% over the next 5 to 7 years.

I hope that with sustained investments and improvements in technology, R&D and Skill development the Indian chemical industry will be well equipped to meet the growing demand. ■



# Succession Planning in the Chemicals Industry



34

## Gautam Chainani

Advisor, Epsilon Carbon Pvt. Ltd.

**A**s the world recovers from a covid-induced economic downturn, India is optimistic about achieving its ambitious target of becoming a USD 5 trillion economy by 2025. Our economy has returned to pre-covid levels of growth at a CAGR of about 9.5%. The chemicals industry, poised to reach USD 300 billion within the same period, is expected to make a substantial contribution towards achieving this milestone. The major industry players are likely to be in businesses like petrochemicals, plastics, specialty chemicals and bulk chemicals.

To achieve these growth plans, chemical companies will have to prioritize their financial robustness, scale of operations and drive geographical spread beyond the shores of India. Further, they will have to manage their energy costs and focus on the sustainability agenda. The underlying assumptions are that companies will strengthen their asset portfolios and drive human capital workforce planning in a manner that caters to overall growth.

The chemicals industry comprises a variety of company structures, viz. listed companies with a large shareholder base;

family-controlled public companies; and privately held companies owned either by families or by private equity / venture capital firms. Although the industry has seen a promising growth trend in recent years, industry veterans and company leaders share one common concern in these exciting times: inadequate talent in the sector to take on the pivotal role of CXO. In the post-pandemic era, this dearth of talent becomes even more critical.

### **Building leadership pipeline**

In this context, succession planning for senior management levels gains even more significance than before. Building a leadership pipeline has become a critical human resource function in the quest for a resilient, growth-oriented organization. Increasingly, organizations are beginning to recognize that succession planning is not the ad hoc 'fill in the future gap' exercise it hitherto was, but a continuous process that engages the entire senior leadership team. Organizations, particularly those with accelerated growth plans, are beginning to acknowledge that their preparation for the future may not be quite as robust as they would like to believe.

While many companies across the sector follow similar processes grounded in committed talent management principles, the challenges they face are, predictably, in implementation of the succession planning process. Industry insiders say

**Although the industry has seen a promising growth trend in recent years, industry veterans and company leaders share one common concern in these exciting times: inadequate talent in the sector to take on the pivotal role of CXO. In the post-pandemic era, this dearth of talent becomes even more critical.**

outcomes range across a wide spectrum; some are well-planned, smooth transitions while others are confusing and hiccup-filled, leading to unfortunate talent disruptions.

### **Tight spots**

The dilemmas faced by senior management while executing succession planning strategies, some of which are highlighted below, illustrate the challenges that need to be addressed on priority.

- Tussle between 'internal to the industry' resource and external 'out of sector' talent. This hiring mindset is common among many companies in the sector. Many specialty chemicals companies, for example, wish to hire senior talent from their specific field only and reluctantly explore talent outside the sector as a compromise rather than as an opportunity. This, despite the fact that 'narrow focused'

talent is extremely expensive and prone to an aggressive counter offer by his/ her current organization.

- The choice between 'tenured performers' and 'potential talent.' Given that the average tenure of middle managers in the chemicals sector is high, there is a tendency to give a higher weightage to those who have stayed longer with the firm. In a talent discussion around potential CXO candidates in a private chemicals company, the promoter told me that his criteria for final selection of a particular candidate was that the person had been 'hand-picked' by his father as a trainee in the company; his appointment as CXO would be seen as a 'reward' for his loyalty, thereby sending the 'right signal' throughout the company. This, despite the fact that assessment results showed him as falling short on a number of leadership competencies critical for the position he was expected to fill.
- The technical nature of the business triggers a succession planning bias favoring functional competence over leadership skills. While middle management teams require high technical competence in operations, maintenance, supply chain and sales roles, recent trends show this bias reflected in HR and Finance functions as well. As a result, the relatively short-term skills for trouble shooting and problem solving are viewed as 'must have' qualities of a successful CXO and inappropriately prioritized over the visionary traits and leadership skills critical for sustainability and growth.
- Viewing succession planning more as a risk management strategy than a business requirement. This is particularly relevant in companies with a global presence. A CEO of a Chemicals company once said that he needed a 'trusted' person to deal with 'foreign' buyers; he viewed attributes like 'having a global mindset' or 'cultural competency' as being of secondary importance. Alas, the individual being considered as a successor to handle the business across Europe and move to an Eastern European country with his family had never even travelled outside the country.
- Refining a functional specialist into a well-rounded leader. When an employee is identified for a wider role as a P & L or a Divisional Head with business responsibilities, the development plans for the individual must be well designed and multifaceted. This entails adequate exposure and immersion through cross functional assignments, indepth understanding of enabling/support functions, interacting with senior leadership and Board members, amongst others. However, many

companies merely treat this critical exercise as a 'tick in the box' by nominating the identified individual for an Advanced Management Program, perceived erroneously to be a panacea for all shortcomings.

## Summary

There are no easy solutions in driving an effective succession planning program. What is evident is the need for promoters, Board Members and CEOs to invest quality time in talent management. They will benefit from changing present biases and hiring talent from outside the narrow sectors they operate in; and delegating authority and decision-making to cross functional teams, thereby facilitating the succession planning process. They must accept mistakes as perceptions change, making corrections as they progress. Building a culture of openness and risk-taking that ensure succession planning is aligned to business goals is an important aspect if chemical companies are to ride the tailwind of growth in India.

Clearly, being in the right time at the right place is as important as having the right people to achieve that vision. ■

# CHEMICAL ENGINEERING WORLD

Dynamic Platform  
to  
Connect with Chemical  
Industry Ecosystem

Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**

[sales@jasubhai.com](mailto:sales@jasubhai.com)

[www.jasubhaimedia.com](http://www.jasubhaimedia.com)





# Envisioning to become the Most Sustainable Infrastructure Company in the World



**Vinayak Pai**

Managing Director, Tata Projects

*Vinayak Pai, MD, Tata Projects talks about the company's multiple initiatives of building resource efficiency, creating low carbon operations by incorporating engineering innovations and India's journey to embark on its Net Zero 2070 goals.*

## **How is your organization responding to the new world order to address the urgency to address climate change?**

Tata Group companies have announced their ambitious Net Zero 2045 target and we have aligned our businesses with the goals of the Government of India

around climate-related issues. GlobeScan Sustainability Leaders Survey 2022 ranks Tata group number 1 in the Asia Pacific on Sustainability and is the only Asian company to feature in the Global Top 15 list. As one of the fastest growing and most admired infrastructure companies in India, we are conscious of the impact

of our operations and services on the environment. We have been proactively working towards improving efficiency of our operations and processes to ensure optimal utilization of natural resources and stay committed to protecting the environment, while contributing to society in and around our more than 200 project sites.

Our sustainability agenda is built on resource efficiency, creating low carbon operations, promoting green vendors and incorporating engineering innovations to reduce our environmental and ecological impact. This is done through dedicated efforts across our project sites wherein we are pursuing our vision of being the most sustainable infrastructure company in the world. Our HSE, Quality and Sustainability policies endorse our commitment to improve our performance on various environmental aspects that go beyond regulatory compliances. Our Environmental Management System helps us in minimizing the environmental impact of our operations and also offers a structured approach for identification and execution of environmental protection measures.

Tata Projects is already extending its footprint across various sectors like River Rejuvenation, FGDs for coal-based power plants, Biofuel Refineries, Coal bed Methane Extraction plants, Waste treatment plants, Remote sensing RO plants, and developing India's first two

**Considering the trajectory of growth and development in India, if the nation's Human Development Index is to increase from the current levels of ~0.65 to 0.8 - its per capita energy consumption will need to quadruple. The challenge that the country faces is to continue its growth path while still maintaining its carbon emissions at sustainable levels.**

anti-smog towers in Delhi. We have built strong capabilities in-house such as design skills & state-of-the-art solution techniques. We have partnered with different international technology providers for executing several such projects and continue to look at the partnership model for our future growth

**What are the opportunities of your organization in the near foreseeable future and key focus areas for business?**

Climate change presents a growing opportunity to Indian business as India embarks on its Net Zero 2070 commitments. There would be various complementary routes to achieving the ultimate Net Zero target. However, as India has abundant renewable energy -

we feel Green Hydrogen will be a major component of India's net zero journey.

Furthermore, as we transition away from coal over the long run - Carbon Capture and storage and CO<sub>2</sub> conversion to useful products will be relevant. India has taken major initiatives towards introducing bio-fuels, through Ethanol blending into Gasoline, and we expect similar moves in Aviation Turbine fuel and diesel in the near term. These areas are our short to medium term focus and we are particularly keen to build our footprint around the entire value chain such as green hydrogen from manufacturing of Electrolyser through to Green Chemicals and Green hydrogen storage and transfer. Resource stewardship, particularly around water management is an area, wherein, we would like to utilize our in-house capabilities. We foresee Energy transition projects at unprecedented scale in India in the coming decade, and Tata Project sees enormous opportunities to move away from traditional path of providing bespoke solutions for each project, and develop standardized designs that would allow parallel execution of similar projects, reduce execution schedule and also bring the down resource availability challenges. Digitalization would take a key role in this *DESIGN ONE BUILD MANY* concept.

**What are some of Tata Projects initiatives & planned investments (in short & long term) to achieve carbon neutrality?**

Tata Projects has focussed on how our businesses can support the country to achieve nation-building goals and to establish a sustainable economy. Our major focus areas is Material Management, use of alternate and sustainable materials, Modular construction techniques, water and waste management along-with developing sustainable supply chain by encouraging Green vendors.

On the Materials Management side, we have developed systems to monitor our material consumption by their categories. This system helps us to ensure optimal material usage across our operations thus contributing to the circular economy agenda.

With a focus on sustainable material selection, our philosophy is to precisely articulate the criteria for material management by reducing, reusing, and promoting the judicious use of resources across all our sites. We promote use of alternate materials such as Fly ash, Ground Granulated Blast Furnace Slag (GGBS), Fly Ash Bricks and AAC Blocks (Autoclave Aerated Concrete) that are made from waste generated from thermal power and steel plants. We are also using PPC cement for making concrete across our sites, replacing conventional shuttering, made of plywood and batten, with Steel/Aluminium/ PVC/ System form works. We have partnered with suppliers w provide simplified solutions to recycling construction & demolition (C&D) waste

and producing M-Sand which replaces natural sand.

Using modular construction techniques such as pre-cast and prefabricated elements, not only helped us improve our overall productivity but also helped reduce material wastage. We also focus on Value Engineering and Lean Engineering to enhance productivity and ensure that our sites function with factory-like precision. Towards the same, we have implemented Building Information Modelling (BIM) systems and other state-of-the-art software, aimed at evaluating designed building features, systems and material selection thereby achieving lower material cost and wastage. Water remains a critical shared resource and we have undertaken initiatives to reduce, reuse, recycle and re-generate water in our operations to the maximum possible extent reducing our dependency on freshwater. Towards better measurement, monitoring and managing, we have installed water meters at various sites and been able to consistently reduce our water footprint through use of curing compounds, PC based admixtures, curing pump synchronization and use of sprinklers. We have also installed WTP/STP at our labour colonies to recycle water and reusing in other activities. Additionally, our aim is to become 'water positive' in the coming years.

We believe that our commitment to sustainability and triple bottom-line of social, economic & environment will

ensure our global competitiveness and promote inclusive growth.

### **How is your organization preparing for future sustainable growth?**

Our organisation has grown exponentially in the last decade. We will embark on a transformation programme to understand how we want to reshape the business. This will help to develop capacity and capability to cater to client's needs in their sustainable journey. We would integrate digital tools in our project execution since we see a global shift towards adopting technologies in engineering and construction thereby allowing us to move up the value chain faster. We would like to establish technology partnership with Global leaders and think differently to align with the organization's growth.

Another huge challenge I foresee for our industry is the availability of right skill-set to meet the demands of the changing world. We need to remember that reskilling of our existing workforce and developing a proper ecosystem to attract the best young talent into our industry, would be key to our success. ■





*As ChemTech World Expo 2022 saw a warm and overwhelming response of bringing together respected industry stalwarts across chemical industry ecosystems, here's what they had to say about their take on erudite expertise shared by speakers, where the industry stands today, addressing challenges and way ahead.*

42



*(L to R) : Mr Yatinder Pal Singh Suri, Mr B Narayan, Mr Subramanian Sarma, Mr Suresh Prabhu, H.E. Katharina Wieser, Mr Maulik Jasubhai & Mr. Hemant Shetty*



## Response of Large Scale Industries to Help Small Scale Players

### Suresh Prabhu

Member of Rajya Sabha Government of India

"Like many other countries in the world, the backbone of India's industry is small scale but there's a linkage between small scale and the large scale. The large-scale industries support a huge number of SMEs. For example, the auto industry, which is the largest manufacturing sector in the country, cannot survive without small-scale industries as most of the components that are assembled on the shop floor of these large companies are made by small-scale players. The response of large companies to megatrends will positively help small-scale companies because these are part of the supply chain. Therefore over a period of time, the initiative taken by industry conglomerates like Reliance Industries, Larsen & Toubro and many others would also help to ensure that those who are vulnerable today on the small scale will also benefit from these large initiatives that will be taken because when you are greening your supply chain you are also helping them indirectly."

43



## Good Cases for Investment

### B Narayan

Group President, Projects & Procurement  
Reliance Industries Ltd.  
Chairman, EPC World Expo 2022

"World makes about 400 million tonnes of petrochemicals. India's demand is 40 million tonnes but we make only 25 million tonnes so there's already a gap of 40% so there's absolutely a good opportunity for India to invest and I see that happening. In that context I would say that products which are going to be really in demand are imported heavily. For example, we import 2 million tonnes of PVC, around 1.0 – 1.3 million tonnes Acetic acid used to manufacture consumer chemicals, acetates, ethers et cetera, 2.5 million tonnes of Methanol, a good building block for many chemicals, 700 – 800 tonnes of Styrene and we do not make carbon fibre at all. So all of these are good cases for us to invest in coming years. Apart from that there's talk about Net Zero which is the government is promoting and Net Zero concept which would involve a lot of investment."



## Need to be as Efficient as China was 10 Years ago

### Subramanian Sarma

Whole time Director & Sr. EVP (Energy), Larsen & Toubro  
Co- Chairman EPC World Expo 2022

"India has always been a price-sensitive market, nothing gets sold until it is very competitive. But now the whole world is getting price sensitive and if China is going to be marginalized for whatever reason, people have been used to low-cost products and now they will go for alternatives but not pay a premium. So the buyers will look for something very competitive and take that opportunity would mean to be as efficient and as productive as what China was 10 years ago and this is what we need to do. One another way to do this is through technology and most important I think what binds all these things is the culture. The culture of entrepreneurship, the culture of cost consciousness, the culture of pride of what we do that has to be built and that is all that will bind these things together."



## Universal Transition: No Industry, No Country will be Insulated

### Dr Raman Ramachandran

Convener,  
Specialty Chemicals World Expo 2022

"This transition will have to be universal. In other words, there is no industry or no country that can be insulated or will be spared from the impact of the transition that is going to happen. So, we in the chemical industry who have relied on transforming carbon compounds from fossil sources with solvents and catalysts and making products for many enabling industries were in some ways part of the problem. But now we really need to act to provide solutions for these problems that it is in our power to develop and provide the solutions. So as an industry that has been an enabler and supplier to many other industries whether it is auto, cement or pharmaceutical, or electronics we have to recognize that our customers have also made commitments for net zero, and some of them as aggressive as 2030 which is just about 8 years."



## Aiming for Diesel Destruction

### Dr SSV Ramakumar

Director (R&D), IndianOil  
Chairman Refining & Petrochemicals  
World Expo 2022

"Days for refining are numbered but not in the case of Asia. Asia & India still nutshell the aspirations of becoming global refining hubs. The refiners have the primary onus to provide energy security to this nation on a growth trajectory and as well as fulfill the announcement & pronouncement of our Honourable Prime Minister to Net Zero by 2070. The need of the hour is that as process technologists, catalyst technologists, and refinery process engineers, we need to instill the requisite flexibility in refining configurations. With the current diesel demand destruction, we are facing the challenge of how the configurations are going to deal with an extra amount of diesel. Now every refiner needs to aim for diesel destruction and technologies are going to come to fore for conversion of diesel to petrochemicals feedstock."

45



## Multipronged Approach Required

### Sanjay Khanna

Director Refineries  
Bharat Petroleum Corporation Ltd

"In last 25 years India has leapfrogged from 60 MMTPA to 250+ MMTPA capacity – almost 300% growth. But there are hardly any significant changes in refining technology w.r.t underlying chemistry and basic unit operations. From last year climate change, net-zero, sustainable growth, various colors of hydrogen have got attention like never before. Today, we do not ask merely for refining capacity but look for energy intensity index, carbon emission index, complexity, petrochemicals penetration, and personal efficiency index and so on. Net zero is no longer an aspirational goal but a necessity for the world and requires a multipronged approach. At BPCL we have taken initiatives for improving energy efficiency, hydrogen management, implementation of biofuels, and setting up renewable energy capacity."





## Proactive Approach will go a Long Way

### R K Srivastava

Director Exploration, ONGC Ltd  
Chairman, Surface Engineering &  
Corrosion Control World Expo 2022

“Managing integrity by stringent monitoring and predicting corrosion well is essential for maximizing the productive life of oil wells. Recent industry advances in protecting coatings new formulations or ways to apply coatings so that they last longer, for instance, functional super-hydrophobic coating systems for possible corrosion mitigation are a must. There have been significant advances in corrosion inhibitors and techniques in cathodic protection. Developments in the use of plant extracts and fruit waste as corrosion inhibitors lead to improvement of the environmental footprint. Again, this is a field that impinges on bringing in the AI & getting to the predictive mode so that you are able to take up those challenges well in time. Choosing the right material through a proactive approach will definitely go a long way to building assets that can withstand corrosion, be safer, require less maintenance, and have longer life cycles.

46



## Offshore Infrastructure gets Severely Impacted by Marine Corrosion

### Pankaj Kumar

Director Offshore, ONGC

“Corrosion is a perennial challenge for the entire chemical industry, Oil & Industry, Petrochemical industry, Refining, Power, whatever- whichever industry you name everywhere it is there. Surface engineering is playing a vital role in finding out mitigation measures to control the corrosion if not avoided completely. This industry is a high-risk, high-reward industry but equally high impacted by the problem of corrosion this increases our downtime and a drop of oil for a molecule of gas not produced because of this downtime ultimately on an annual basis impacts the production, company to company, country to country. Offshore infrastructure is expensive, complex and even further impacted by the corrosion of marine origin. So, it is really helpful to understand the parameters, structure, method of production during the design stage itself. Optimizing the design of oil infrastructure will ultimately lead to safe & well-protected structures, putting surface engineering, cathodic production, and painting to use to protect Oil Platforms, Pipelines against corrosion, the need of the hour is to explore new technologies, and provisions that can really be beneficial to address this problem. While mitigation measures are there in place, the focus is needed on digitization, real-time monitoring are need of the hour for taking timely intervention through productive maintenance and analytics-based forecasting.”



## Bridge the Glaring Gap

### U K Bhattacharya

Director Projects, NTPC Ltd  
Chairman Industry Automation &  
Control World Expo 2022

"In Indian context Industry, 4.0 has already started but maybe not in the fullest way. But in the developed world Industry 4.0 is normal. Now this new normal that we are seeing in India will remain new normal unless we want to move forward fast. Today, the industry is very impatient to do more, daring to do more, doing things faster. The clock should move really fast and that sets the context of Industry 5.0 with the intent to assimilate 4.0 and imagine something which is knocking at the door in the developed world and will knock 20 to 30 years hence at our doors. Unless we bridge the glaring gap between this automation which is real in the developed world and automation that we are used to will always remain a developing world despite our aspiration to become a first-world country. The developed world, especially Europe and has reached the digital age today through a hard path of Agrarian society then Industrial society through 300+ years of Industrial revolution and then the digital path and the digital age. We need to understand that we did not even go through the Industrial age, but we are going into a digital age. When you discuss Industry 5.0 in the Indian context and take forward the actionable points, you have to keep in mind that the Indian psyche of the workers as well as consumers will always remain half-hearted in terms of Industrial and neo-digital and may be semi-agrarian. So it is a mix and these psychological parts we must understand before we get into the digital world."

47



## It is the consumer footprint

### Sudhir Sitapati

MD & CEO, Godrej  
Consumer Products Ltd

"For most of my career, whenever we spoke to partners in the Specialty Chemical industry, we were all interested as business people into things, one was superior efficacy and second was in affordability and reduced costs. This is really the paradigm in which we all operate for many many years, I think there has been a pretty significant change in terms of a third dimension of sustainability which has come in over the last decade or so. I think the sustainability agenda is not a particularly new one and certainly for the last 10-15 years many companies have been focusing on sustainability, a lot of the focus in the prior decade was really on whatever you could do to sustainability in terms of manufacturing processes and factories."

## From Pure to Green



**Ajay Popat**  
President, Ion Exchange

48

**W**ater plays a very important part in achieving global Net Zero goals by 2070. The world is transitioning toward carbon neutrality by substituting fossil fuels with green, renewable energy sources like Green Hydrogen. It is expected that Hydrogen alone will account for a 20 percent reduction in CO<sub>2</sub> emissions by 2050. Green Hydrogen business in the near term, viz 2030 is expected to be 150 Billion USD, globally. This in turn will require a huge quantity of water to produce Hydrogen, placing an

additional burden on already scarce water required for food production, domestic consumption and industrial purposes.

Thus, use of alternative water sources for Hydrogen generation by electrolysis of water using sea water or recovering Hydrogen from (excess) Ammonia present industrial/domestic waste and /or using Biogas / Bio methane liberated from the treatment of organic waste generated by industries, homes and communities is expected to reduce the burden of using freshwater

resources with the additional benefit of managing large volumes of waste (liquid and solid).

Advancements in treating alternative sources of water viz Sea Water, Industrial and Municipal effluents to desired high purity level as required for Electrolyzers for producing Hydrogen from these sources and advanced Biomethanation processes to generate green energy (bio methane ) with high efficiency, purity and its subsequent conversion to hydrogen or green ammonia, not only subscribe to circular economy goals but will also lead the initiative for carbon neutrality as pledged by nations.

Ion Exchange is proud to lend its know-how, and experience in producing high purity water from alternative water sources apart from integrating water and green hydrogen/ammonia production for meeting carbon-free energy needs of industries in MSME and Heavy Industry Sectors. ■

# CHEMICAL ENGINEERING WORLD

Dynamic Platform  
to  
Connect with Chemical  
Industry Ecosystem

Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**

[sales@jasubhai.com](mailto:sales@jasubhai.com)

[www.jasubhaimedia.com](http://www.jasubhaimedia.com)





## Coal Gasification in Indian Context

50

India has a reserve of more than 300 Billion tonnes of thermal coal and about 80% of coal produced is used in thermal power plants. With environment concerns and development of renewable energy, diversification of coal for its sustainable use is necessary. Coal gasification is considered as a cleaner option compared to burning of coal. Synthesis Gas produced from Coal gasification is usable in producing Synthetic Natural Gas (SNG), energy fuel (methanol & ethanol), ammonia for fertilizers, reduction of Iron and steel making. These products will help move towards self-sufficiency under Atmanirbhar Bharat Abhiyaan. In line with the above objective, Ministry of Coal has taken initiative for utilizing coal through coal gasification and to achieve 100 MT of coal gasification by year 2030.

**Steel making:** As per National Steel Policy, India is expected to build a capacity of 300 million tonnes of steel per annum to cater to demand of around 255 MTPA by 2031. To support this demand and

the necessary production process, the requirement of coal would be to the tune of 300 MTPA of which around 165 MTPA would be coking coal, 35 MTPA coal for PCI (pulverized coal injection) and around 100 MTPA would be non-coking coal for DRI (direct reduced iron or sponge iron prod). Coke is an essential input for production of steel and currently about 0.9 Tonne of coke is required to produce 1.0 Hot Metal (HM) through blast furnace route. Indian coking coals are inferior to imported coking coals in terms of ash and other properties. Synthesis Gas (H<sub>2</sub> and CO) is an important reducing agent for reduction of Iron ore and are environment friendly method of steel making through DRI route. JSPL has already set up a plant for steel making through Gas based DRI and currently running normal at present.

**Reduction in emission:** CO<sub>2</sub> emission per tonne of steel produced is almost double in Blast furnace route as compared to synthesis gas based DRI route. Thus, coal gasification-based steel making will reduce the emission and utilisation of CO<sub>2</sub> which is already captured into different

chemicals, may be a useful solution.

**Conversion to hydrogen:** Synthesis gas may be easily converted into Hydrogen through Shift reactor and PSA. Hydrogen is the most effective reducing agent for DRI plant and is an automatic choice for cleanest steel making process

### Challenges in Coal Gasification:

Indian coals are mostly low rank, high ash coal. Conversion of high ash coal to synthesis gas is a challenge due to lack of proven technology. Even though, JSPL is successful of gasification of high ash coal, fines (40`50%) associated with feed can't be handled in fixed bed Gasifier. Huge capital cost and infrastructure requirement are also major challenges of setting a new plant. Costs of chemicals produced through synthesis gas route are at par with imported chemicals due to huge transportation cost.

### Coal Gasification Plant-Angul, JSPL:

CGP of JSPL has installed capacity of 225,000 Nm<sup>3</sup>/h of pure Synthesis Gas and caters the requirement of DRI of running at its full capacity. It is first of its kind of DRI plant in the world using synthesis gas made from Coal. JSPL is the pioneer of using indigenous coal to make steel, hence reducing the dependency of imported coking coal. We are determined to utilize our own coal to the maximum possible

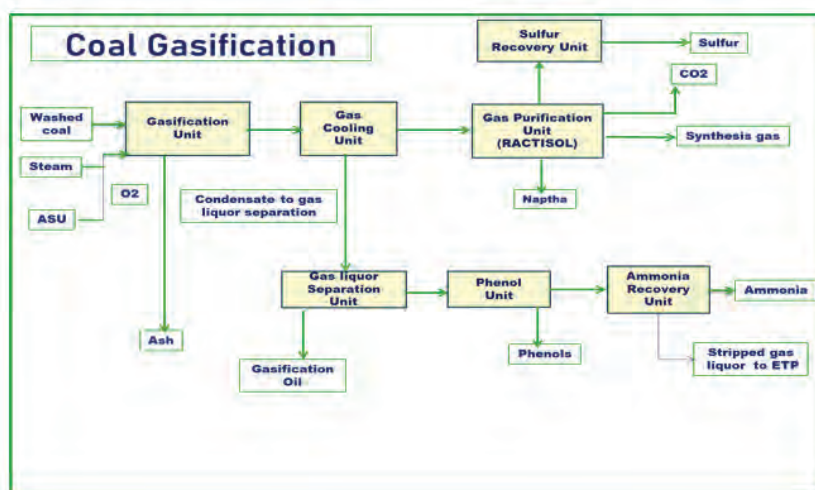
either through steel making or converting to useful chemicals.

### Salient features of CGP, JSPL:

- High ash (~46%) low grade coal is received from mines.
- Coal is further treated in Beneficiation plant to meet the design criteria of ash (~36%)
- No of GASIFIERS : 07
- Feed stock : Non coking coal of 34-35% ash
- Technology : Air Liquide (Lurgi, Fixed bed dry bottom)
- Coal requirement : 269 ton/hr
- Syn gas produced: 2,25,000 Nm<sup>3</sup>/h for use in DRI
- Calorific value : 3400~3700 kcal/Nm<sup>3</sup>

51

### Process flow diagram of CGP:



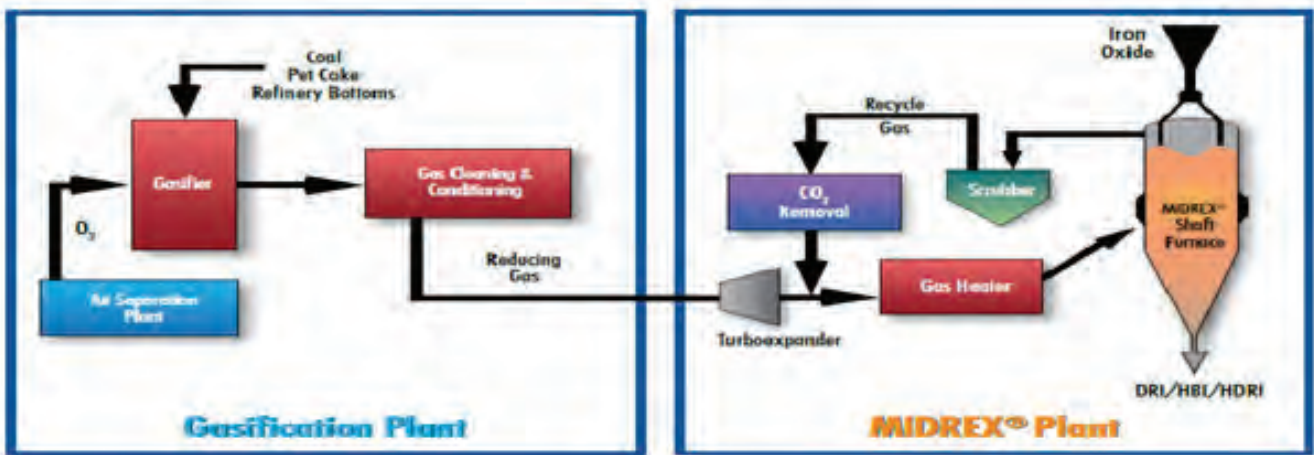
**FEATURES**

**Utilization of synthesis gas in DRI:**

Pure synthesis gas (52% H<sub>2</sub>, 32% CO, CO<sub>2</sub><3%, CH<sub>4</sub> 10%) is used in Shaft furnace of DRI to reduce Iron Oxide into metal Iron.

Abundantly available non-coking coal in country can be used effectively in Synthesis gas based DRI

- Conventional Midrex plant need Natural Gas as a source of Reducing



52

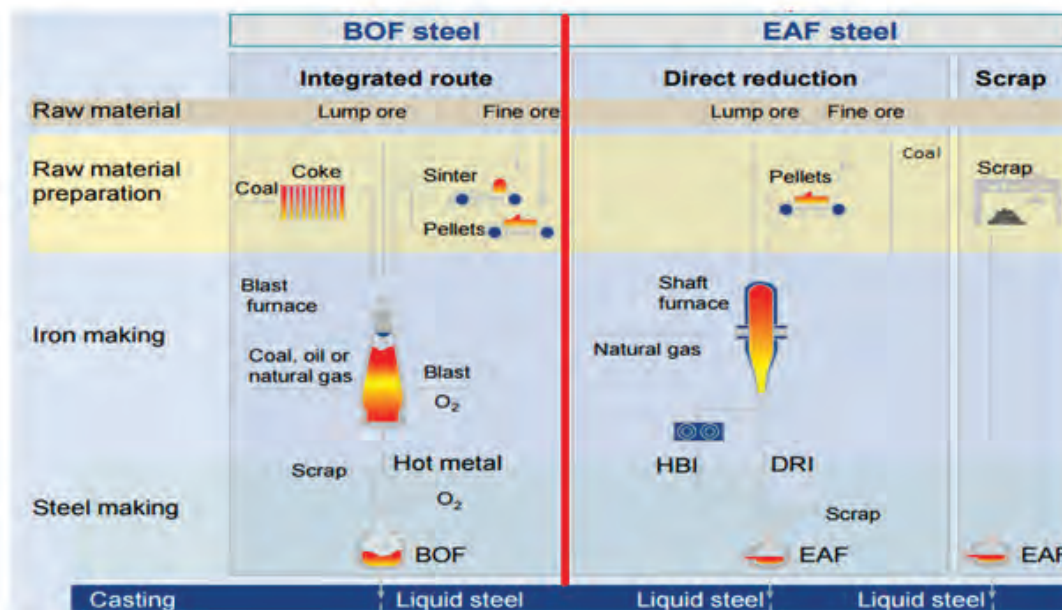
**Advantages of Syngas based DRI:**

- In India, Metallurgical coal reserves are limited & thus expensive Coking Coal need to be imported for BF route.

gas which is main component of making Iron ore oxide/ pellet to DRI.

- India being a country of importing natural gas and also coking coal, use of domestic low grade coal as

substitute for natural gas and making DRI was very much essential.



- So Making DRI through Coal gasification was enabling for import substitute



natural gas as well as coking coal by making steel from DRI.

- CO<sub>2</sub> emission is less as compared to BF route.

### Challenges and path forward:

- Acute shortage of coal associated high price to manage coal gasification plant.
- Inconsistent Quality of coal due to coal procured from different sources
- Coal logistics
- Handling of ash generated during gasification
- Non availability of proven coal gasification technology for Indian coal
- JSPL is allotted Utkal B1/B2/C blocks which are approximately 20 KM away from the existing plant.
- It will take approximately six months to start production and supply to the plant.
- Land acquisition, rehabilitation and

development of road are the main challenges.

- Stability of the Gasification plant will definitely improve after consistent supply of coal is ensured.
- Cost of synthesis gas and cost of steel production will also improve after we start utilizing coal from our own mines. ■

53

## Author



### Naveen Ahlawat

Chief Procurement Officer & Head-  
Green hydrogen and Gasification  
Projects, CCSU  
Jindal Steel and Power Limited



# Carbon Emissions and the Importance of Being Earnest



54

## Rob Jenkinson

Net Zero Program Manager  
SKF

Once again in 2022, global temperature records are being broken across the world, the number of extreme climate-rated events continues to rise alarmingly. The need to drastically reduce global emissions of greenhouse gases (GHG's), mainly carbon dioxide has never been so clear. But how can we know if the measures aimed at reducing GHG's taken by individuals, businesses and governments are actually delivering the reductions promised and needed?

The answer of course is we need to measure. We need to measure where we have come from, where we are now, (the base line), we need to quantify the impact of planned actions, we then need to verify this year after year, month after month.

We need to measure at multiple levels; geographically, by industry, by company by individual process, system and even component levels. We need to measure the full life cycle and system impact – from raw material extraction, through production, transportation use and

eventual disposal at the end of life. This life cycle and system perspective is vital because changing design or material aspects to optimize emissions based only on one part of a products life cycle can lead to unseen negative impacts in other parts of the life cycle.

We need all these measurements to be accurate and reliable. At the same time, we need the methods to measure and calculate the impacts to be practical and avoid overwhelming administration. Above all we need to approach the measurement of GHG's with a resolute commitment to being earnest. Earnest about the impacts we have, the potential savings we can realize and, in the end, about the challenge we have globally and the viability of our plans to address it.

### **Aligning with the GHG protocol**

At SKF we have used the GHG Protocol as the accounting standard for our reported GHG emissions since 2006. The protocol is without question the most widely acknowledged standard of its kind and provides a common terminology and methodology with which organizations can report their direct and indirect GHG emissions. The protocol defines 3 scopes or organizational emissions. Scope 1 – direct emissions of GHG from the company's operations, for SKF this mainly relates to our combustion of fossil gas for building and process heat. Scope 2 – emissions resulting from the external generation of electricity and district heat

used in the companies' operations. For SKF this mainly relates to electricity. Finally, Scope 3 – which covers all other indirect emissions downstream and upstream and is broken down into 12 categories. Here SKF's most significant impacts upstream relate to direct materials (mainly steel) purchased to make our products and inbound and outbound logistics.

Downstream is a more complex story. The use phase emissions (when our product is running in a customer's application) for a component manufacturer like SKF can be calculated on a product or system level. For example, we can calculate the frictional losses within a bearing arrangement, and when we know the energy source, convert this into greenhouse gas impact. However, calculating aggregated use phase emissions on a corporate level for components that are applied across more than 40 globalized industries in a meaningful way is extremely challenging. This is due to the nature of the SKF product offering and our position in the value chain. The same SKF product can typically be applied in multiple different applications. Each application has potentially very different energy use and associated greenhouse gas impacts – defined by factors such as the loads, speeds, and operating cycle as well as the energy source applied in the machine or system. On top of this, a significant percentage of SKF's products are sold

via our globalized distributor network – and very often it is not possible for us to know where the product is applied (which customer, which industry).

Therefore, we focus on providing our customers with useful calculations of the GHG emissions associated with our products when running in their specific applications and systems. With this approach we can help customers to optimize these systems for friction, weight, and life – in the end reducing their operational impact (scope 1 and 2) or the impact of use from their customers (scope 3). A recent example of this approach can be found in our launch of SKF's CO2 dashboard, a free-to-use tool that estimates CO2 emissions for single rolling bearings, illustrating estimated emissions related to the production phase and from frictional power losses and grease consumption when in operation.

### Strategies to increase sustainable efficiency

Calculating SKF's scope 1 and 2 emissions is more straightforward, however there is some ongoing debate globally about scope 2 emissions calculated for electricity used. SKF is a signatory to the RE 100 initiative, signaling our commitment to move to sourcing 100% of our electricity from renewable sources by 2030. In 2021 around 50% of the electricity purchased by SKF was renewable. Our approach to sourcing renewable electricity varies depending on the region and

what solutions are available. Currently, SKF is using a mix of purchasing of Environmental Attribute Certificates (such as Guarantees of Origin) and Power Purchase Agreements (PPA). We use a specialist, global third-party to confirm the credentials of each approach used and that they are in line with the GHG protocol scope 2 reporting guidance. Going forwards, our intention is to use PPA's as much as possible due to the enhanced credibility and better economic performance provided by this approach.

Our belief is that by sourcing renewable energy we create additional demand for its generation and thereby make a positive contribution to increasing the share of renewable energy overall. Nevertheless, some stakeholders voice concerns about the environmental effectiveness of certain methods of renewable energy sourcing.

### Moving away from carbon-intensive processes

Looking at upstream scope 3 emissions, purchased steel and steel components represent by far the most significant volume of material sourced by SKF, in terms of weight and value. This is because most of our products are primarily made from steel and (for the time being) steel production and processing is generally highly energy and carbon intensive. In simple terms, steel can be derived from scrap or from iron ore (virgin steel) or a mix of these two raw materials. Producing from scrap is a far less energy and

carbon intensive process than ore-based production. Scrap production is commonly available now whereas to decarbonize ore-based steel production will require a major transformation of the existing global production infrastructure – costing trillions of dollars and taking at least a couple of decades to complete. However, global demand for steel far exceeds available scrap levels (scrap ~30% of global demand) and will continue to do so for several decades.

If companies were to source only scrap-based steel, the total need for other users to source ore-based steel would remain the same and so, broadly speaking would the overall quantity of greenhouse gases released into the atmosphere. It's therefore vital to find ways to measure (and motivate) the carbon efficiency of steel production which address this challenge and factor in the impact of the % of scrap used.

## Summary

As the adage says; 'you can't manage what you can't measure.' Driving down greenhouse gas emissions requires companies, governments, and individuals to make sure that those measurements really do reflect the reality seen by the earth's atmosphere. It's not always easy to do this but taking a pragmatic and above all earnest approach it can and must be done. ■

# CHEMICAL ENGINEERING WORLD

Dynamic Platform  
to  
Connect with Chemical  
Industry Ecosystem

Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**

[sales@jasubhai.com](mailto:sales@jasubhai.com)

[www.jasubhaimedia.com](http://www.jasubhaimedia.com)





Dynamic Platform  
to  
Connect with Chemical Industry Ecosystem  
Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**



Embed Product Video



Choose the embedded features: insert all  
embedded features Contact: sales@jasubhai.com

# Construction Projects -Breakdown of Rates, Quantities, Items, Drawings in a Lumpsum Contract

*A bill of quantities is a document used in tendering in the construction industry in which materials, parts, and labour (and their costs) are itemized. Rashid Hussain in this article provides details on issued Bill of Quantities to tenderers to easily prepare a price for carrying out the works.*



Bill of Quantities (BOQ) is a document used in tendering in the construction industry in which materials, parts, and labour (and their costs) are itemized. It also (ideally) details the terms and conditions of the construction or repair contract and itemizes all work to enable a contractor to price the work for which he or she is bidding.

Bills of quantities are prepared by quantity surveyors and building estimators, and "Indeed the bill of quantities was the raison d'être for the development of quantity surveying as a separate profession. Bills of quantities are prepared by a "taking off" in which the cost of a building or other

structure is estimated from measurements in the Architects, Structural Engineers, and other building consultants' drawings. These are used to create a cost estimate such as in regard to the square area in meters of walls and roofs, the numbers of doors and windows, and systems as heating, plumbing and electrics. Similar types of work are then brought together under one item, a process known as "abstracting". Estimating books provide the relevant costs of the materials and labour costs of the operations or trades used in construction. As the rates for materials and labour change due to inflation, these books are frequently republished.

The practice historically of estimating

building costs in this way arose from non-contractual measurements, taken off drawings to assist tenderers in quoting lump sum prices.

The Company shall have the right to request a change (herein referred to as "Change") in the Work within the general scope of the Contract. Such Change can be, without limitation, additions, deletions, revisions or changes in the sequence of performance of the Work, and the Contractor shall perform the Work as changed. When Change is requested, the Contractor shall review and evaluate such requested Change and shall within seven (7) days give his written response to the Company's request advising his additional cost, if any, and any possible impact on the Time for Completion. The Contractor shall provide a sufficiently detailed breakdown of the proposed Change cost along with vendor/subcontractor quotations for materials and equipment, if any, and schedule analysis in case the work schedule will be impacted.

Should the Company, at its sole discretion, decide to implement such Change, the Consideration and/or the Time for Completion shall be consequently adjusted if necessary. The increase or decrease in the Consideration and/or the impact on the Time for Completion resulting from such Change shall be agreed by both parties in writing. If the Contract provides applicable rates for Change, the adjustment in Consideration shall be

made in accordance with such rates. If not, the Change shall be evaluated using fair market rates. Should the Company and the Contractor fail to agree as to the amount or method of determining adjustments in compensation due the Contractor, or whether a direction from the Company constitutes a Change, the Company may direct the Contractor, in writing, to proceed with the Work as changed and the Contractor shall proceed with the Work. The Company shall compensate the Contractor or calculate the credit due the Company in accordance with its good faith estimate of the cost or savings resulting from the Change. The Contractor's performance of such Work shall not prejudice his position that such direction constitutes a Change, that the Time for Completion should be adjusted, or that the Contractor should receive additional compensation for such Work. Further, the Contractor's performance of such Work shall not prejudice the Company's claim for a credit. A failure to agree shall be resolved pursuant to the provisions the laid down procedures Claims & Arbitration of Company.

The Contractor shall inform the Company in writing within fourteen (14) days following the occurrence or discovery of an item or event which the Contractor knows, or reasonably should know, may result in a request for additional compensation under the Contract, and within thirty (30) days shall submit to the Company details of the financial effects

thereof. Such financial effects shall be calculated by use of the applicable rates (if any) set out in the Contract. In addition, the Contractor shall take all reasonable steps to minimize resultant costs and shall submit any documents requested by the Company to substantiate such steps taken. The Contractor shall not be entitled to additional compensation unless the requirements provisions of below articles are complied with.

The Company and the Contractor shall endeavour to satisfactorily resolve the matter and if resolved, the Contractor's entitlement shall be confirmed by the issue of an appropriate Amendment if such an item or event entitles the Contractor to a variation in the Contract.

Should the matter not be disposed of to the Contractor's satisfaction, the Contractor shall forthwith deliver a written notice of claim with all supporting documentation in duplicate to the Company at the following address: ■



## Author

### Rashid Hussain

Author, Advisor, Project Director, Course Director, Lead Tutor, FIDIC Expert, Executive Director 3C

# CHEMICAL ENGINEERING WORLD

Dynamic Platform  
to  
Connect with Chemical  
Industry Ecosystem

Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**

[sales@jasubhai.com](mailto:sales@jasubhai.com)

[www.jasubhaimedia.com](http://www.jasubhaimedia.com)





Dynamic Platform  
to  
Connect with Chemical Industry Ecosystem  
Direct Reach  
to  
**>200,000 Readers**  
across  
**>25 countries**



Embed Product Video



Choose the embedded features: insert all  
embedded features Contact: sales@jasubhai.com

