September 2023

International Integrated **Energy** Special Issue

# Oil Gas & Power

www.jasubhaimedia.com

## Digitalization

Oil Gas & Power World Expo 2025

5-7 March 2025, Mumbai, India

Jasubhai MEDIA

seal.tech

# sealmatic®

# MECHANICAL SEALS

Oil & Gas
Refinery
Petrochemical
Chemical
Power
Fertiliser
Pharmaceutical
Paper
Aerospace
Marine


**Sealmatic India Ltd.**
Bldg A, Indiplex IV, Survey No-12, Hissa No-9A,
Village Ghodbunder, Shanti Vidya Nagri Road,
Mira Road (E). Thane - 401104. India.

T : +91 22 50502700
E : info@sealmaticindia.com


TÜVRheinland®
European Directive 97/23/EC
QS-System (Module H)

TÜV INDIA
CE Ex II 3 G/D c T2
ATEX - 2014/34/EU

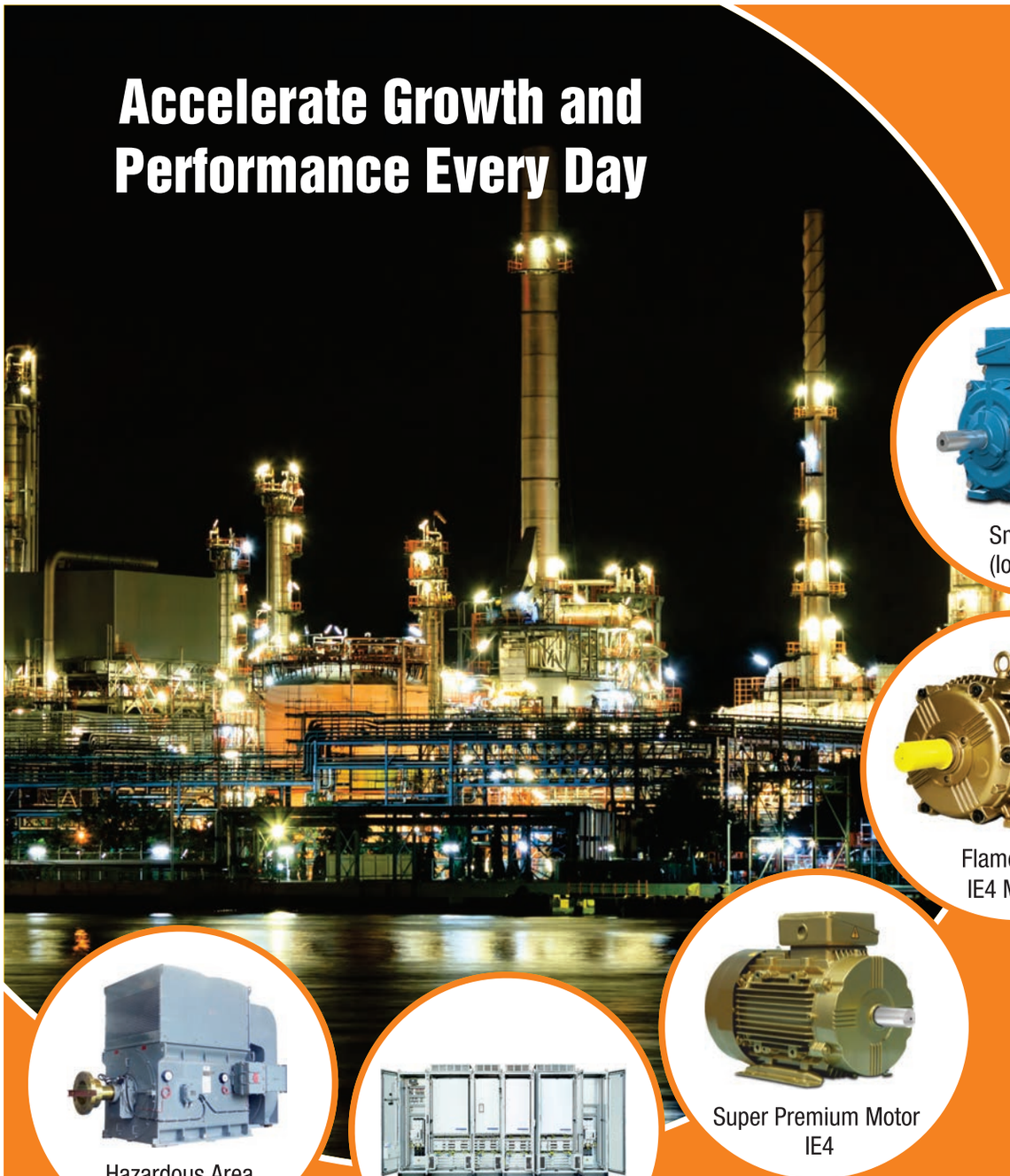
UKAS MANAGEMENT SYSTEMS
ISO 9001:2008
ISO 14001:2004
BS-OHSAS 18001:2007

Q1 API Spec Q1 Registered

sealmaticindia.com

# Accelerate Growth and Performance Every Day

Smart solutions.
Strong relationships.



Smart Motor
(IoT Based)

Flame proof
IE4 Motors



Super Premium Motor
IE4



Hazardous Area
Motors

Total VFD
Panel Solution

## Enhance

## **Efficiency** and **Productivity**

## in the Oil & Gas Industry with

## **CG Motors and Drives**

murugappa

**CG Power and Industrial Solutions Limited**
Registered Office: CG House, Dr Annie Besant Road, Worli, Mumbai 40030
Maharashtra, India. I Email: sales.care@cgglobal.com I Visit: www.cgglobal.com

Follow us on
CG Industrial Division

International Integrated ENERGY Special Issue

# Oil Gas & Power

SEPTEMBER 2023



**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:**

Jasubhai MEDIA

More than
**750+**
Satisfied
Clients

# CORROSION FREE
# COMPOSITE SOLUTIONS



**FRP CABLE MANAGEMENT SYSTEMS**



**FRP GRATINGS**



**FRP HANDRAIL**

Approved with all major consultants and EPC Contractors for Chemical and Process Plants

Corrosion/Chemical Resistance

Flame Retardant

100% Non-Metallic

**MANUFACTURER OF FIBERGLASS / FRP / GRP**

Cable Trays | Gratings | Structural Profiles | Ladders | Cable Cleats | Fencing | Handrails
Staircases & Platforms | Safety Marker line

Aéron©
THE COMPOSITE EXPERT...

www.aeroncomposite.com

## AERON COMPOSITE PVT. LTD.

Reg. Off.:- Plot. No. 30/31, Saket Industrial Estate, Opp. HOF Furniture,
Sarkhej-Bawla Highway, Moraiya-382213, Ahmedabad, Gujarat - INDIA
T : +91-90331 58500 | F : +91-79-26561238 | M : +91-99099 44817
E : sales@aeroncomposite.com, info@aeroncomposite.com

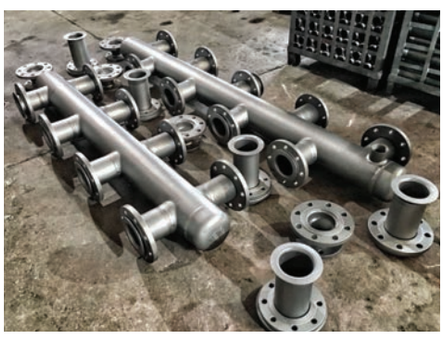
**Dealers & Distributors Inquiry Solicited**

# CONTENTS

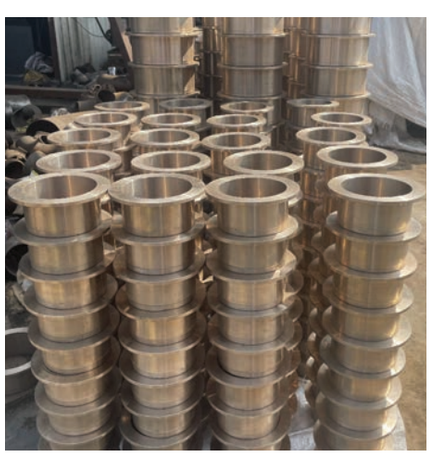
## Manufacturer of Piping Products (Pipe Fittings), Hot Induction Bends & Piping Spools.

Dynamic Forge

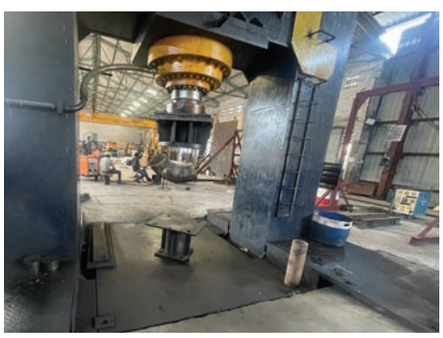
Dynamic Forge & Fittings (I) Pvt Ltd is committed to satisfy the various needs to customers have been part of our role in the Industry, since our inception in 2009 as a manufacturer of Piping Products, Hot Induction Bends and Piping Spools in accordance with National & International.



**India's largest**
**Industrial Pipe Fittings Manufacturer**
**in Stainless Steel, Alloy Steel & Carbon Steel**



**Simplify your Bending & Piping requirements with us**



## Dynamic Forge & Fittings (I) Pvt Ltd


**Corporate H.O. :**
619/620, 6th Floor, Prasad Chambers, Tata Road No. 2, Opera House
Girgaon, Mumbai – 400 004. India, Tel: +91-22-23855158/2385 5159
Fax: +91-22-23855559, Email: info@dynamicforge.com

**Plant :**
Plot # 237, GIDC, Umbergaon, Dist. Valsad, Gujarat – 396171, India
Tel: +91-260-2562013, Email: works@dynamicforge.com


www.dynamicforgefittings.com

## Govt is thinking of permitting accrual of carbon credits for exported green hydrogen and green ammonia


R. K. Singh, Union Minister for Power and New & Renewable Energy

**New Delhi, India:** The Union Minister for Power and New & Renewable Energy R. K. Singh said that round-the-clock renewable energy will cost just about ₹. 6 per unit if green hydrogen is used for storage. Speaking at the Special Ministerial Session of the Fourth International Conference & Exhibition on Clean Energy in New Delhi, R. K. Singh said that the cost of Green Hydrogen would be cheapest in India and that the Green Hydrogen would become a viable energy storage alternative.

"Green hydrogen is cheaper than gas and battery energy storage systems. We have come up with a pilot bid for about 100 MW which we hope will establish the benchmark. Once we are able to use green hydrogen for our energy requirements, all supply chain issues such as availability of lithium-ion batteries will be resolved. We will make green hydrogen and use it as storage. The average price of power in the energy exchange has recently been ₹. 8 per unit, so if our cost for round-the-clock renewable energy comes to ₹.. 6 per unit, we are in business. That is what the future is: renewables. The future is here, not far away." The theme of the Special Ministerial Session, held on the closing day of the two-day summit, was "Global Champions for Advancing Clean Energy Innovation & Manufacturing".

The Minister informed the industry that the basic legal framework for carbon market has been formulated and that the government is thinking of permitting the industry gain carbon credits for green hydrogen and green ammonia which is exported from India. With this, the industry will have yet another advantage, which will make Indian industry totally competitive, added the Minister.

The Power and New & Renewable Energy Minister said that more and more people are going to come and invest in renewable energy sector in the country. "UAE wants to make investment here, since they see the future here. Getting investment for green transition is not an issue, investment is coming since we have de-risked the system and made the whole system transparent. Every generator's power bills are totally up-to-date. Legacy dues of discoms have been reduced to less than half of what they were, and this too will be wiped out in next 2 – 3 years. Every genco is now profitable. AT&C losses have come down and the system is totally viable now. Everything has been made conditional on prudential norms."

## Raj Kumar Chaudhary takes charge as Director (Technical) of NHPC Limited

*NHPC Limited has announced the appointment of **Raj Kumar Chaudhary** as Director (Technical) of the company. Earlier, He was holding the post of Regional ED (Technical) in NHPC Ltd. Raj Kumar Chaudhary has worked at various positions in Cost Engineering and Design & Engineering departments at Corporate Office and in Koel Karo, Kalpong, Teesta-V and Subansiri Lower HE Projects of NHPC. He has also served as Director (Technical) in Mangdechhu & Punatsangchhu-II HE Projects in Bhutan. He possesses experience in all aspects of development of a hydro-project from concept to commissioning and has contributed in development of hydropower in India and Bhutan.*

# LINED PIPES & FITTINGS SOLUTIONS
## FOR CORROSIVE APPLICATIONS

UNPPolyvalves

Manufacturer of PFA/FEP/PTFE Lined & Plastic Valves, Pipes & Pipe Fittings


**SIZE RANGE**
½" to 24"

**PIPES**
ASTM A 106 Gr. B SCH 40
SA 312 TP 304
SA 312 TP 316

**LINING OPTIONS**
PTFE
ANTISTATIC PTFE #
PFA
FEP
ANTISTATIC PFA #
PVDF

**FLANGES**
ASTM A 105
IS 2062
SA 182 F 304
SA 182 F 316

**FITTINGS**
ASTM A 234 WPB
SA 403 WP 304
SA 403 WP 316

**CASTINGS**
ASTM A 216 GR.WCB
ASTM A 351 GR.CF8/CF8M

# CONDUCTIVE

inhouse

**VADODARA - OFFICE & FACTORY**

5 to 12 PR Industrial Estate, Por GIDC - Kashipura Road,
Moje : Kashipura - 391 243, Dist. Vadodara. INDIA
Phone: +91 70434 30467/77, 70430 20707
Email : sales.baroda@polyvalve.com

**MUMBAI - THANE**

207, Orion Business Park, Next to Cine Max, Kapurbawdi,
Ghodbunder Road, Thane (W) - 400 607. INDIA.
Phone: +91 22 2589 6422, 2589 6524 /25
Email : sales.thane@polyvalve.com

www.polyvalve.in
www.polyvalve.com

The Minister informed that 5.8 million tons of green hydrogen at various stages of capacity is already being set up, under the National Green Hydrogen Mission. "We will be the biggest exporter since our green hydrogen and green ammonia cost is going to be the lowest in the world. And we will come up with another bid for grid scale storage. All that you have to do is to take advantage of the growing demand. Future Renewable Energy Purchase Obligations are going to be issued under the revised Energy Conservation Act. If any obligated entity falls short, they will have to pay a huge penalty."

## India's energy demand will continue to provide fuel for future economic growth


Hardeep Singh Puri, Union Minister of Petroleum & Natural Gas

**New Delhi, India:** Talking about the fast progress made by India in green and clean energy sector, Hardeep Singh Puri, the Minister of Petroleum & Natural Gas and Housing & Urban Affairs, said that the 10 percent target on biofuel blending by November, 2022 was attained 5 months in advance, and the 20 percent biofuel blending target of 2030 has been advanced to 2025.

The Petroleum & Natural Gas Minister Puri was addressing the gathering at inauguration of 26th Energy Technology meet. Speaking on management of 3 challenges in the energy sector i.e. availability, affordability and sustainability, he said, for a start we did not allow our challenge on sustainbaility to deccelerate infact we accelerate.

The Minister said that we are shedding this limit of 20 percent as this limit was imposed by us on ourselves because the automobile companies told that up to 20 percent blending not much change is required in engines. But now, he said, we have 20 percent blended fuel, and the process of setting up of ethanol and biogas plants etc. is underway rigourously. The automobile manufacturers are also moving forward in terms of technological advancements. Giving example of the recently launched Green Hydrogen Bus by India Oil, he said that now we are going into new technological mindset, we have elecric cars and other flexi-fuel vehicles.

Speaking about rising energy demand of the country, the Minister said that India's energy demand will continue to provide fuel for future economic growth and is bound to grow exponentially in the coming years. He said that at present the country is world's 3rd largest consumer of oil, 3rd largest LPG consumer, 4th largest LNG importer, 4th largest refiner, 4th largest automobile market. India is likely to account for 25% of global energy demand growth over the next two decades, he emphasised.

## Tajinder Gupta appointed as Director (Power), BHEL

***Tajinder Gupta*** *has assumed charge as Director (Power) on the Board of Bharat Heavy Electricals Limited (BHEL). A 1989 batch Instrumentation and Control Engineering graduate from Birla Institute of Technology and Sciences (BITS), Pilani, Gupta was Chief General Manager in NTPC Ltd. prior to joining BHEL.Gupta joined NTPC, as Graduate Engineer Trainee officer in 1989 and has 34 years of diverse and versatile experience in project management and concept to commissioning of power projects, across various states in India.*

*At NTPC, Gupta was instrumental in the development of large size greenfield and brownfield power projects, besides operating and maintaining NTPC's vast fleet of power stations. In the Director's secretariat at NTPC's corporate office, he spearheaded the team for time bound construction and commissioning of multiple infrastructure assets crucial for the operation of NTPC. Gupta was head of the construction team at the 2x660 MW Khargone power project with Ultra Supercritical parameters.*

With launch of Biofuels Alliance, Puri, said that the global biofuel market will go up from 92 bn dollars at present to 200 bn dollars very shortly. However, this is not the end of the story. The real story on biofuels has just started. The 10 percent ethnaol blending has led to considerable savings on the import bill and it will increase with 20 percent blending, he stated. The Minister said that the surest means of determining a country's growth is to look at its energy consumption and India's energy consumption is 3 times of the global average. Going forward, he suggested, we should have more gatherings like this, encourage more countries to come and take advantage of all the discussions.

Centre for High Technology (CHT), under the aegis of the Ministry of Petroleum & Natural Gas, Govt. of India is organising the 26th Energy Technology Meet (ETM), during 9-11 October 2023 at International Exhibition Cum Convention Centre (Bharat Mandapam), Pragati Maidan, New Delhi with Engineers India Limited (EIL) and Numaligarh Refinery Limited (NRL) as co-hosts.

The event was inaugurated by Petroleum & Natural Gas Minister Hardeep Singh Puri in the august presence of Rameswar Teli, Minister of State of Petroleum and Natural Gas & Labour and Employment, Pankaj Jain, Secretary, PNG and Dr Anil Kakodkar, Eminent Scientist and Chairman of Scientific Advisory Committee on Hydrocarbons of MoP&NG, CMDs, Directors and Senior Executives of Oil Companies.

## PHDCCI submits 10 vital recommendations for India's 19,000+ crore National Green Hydrogen Mission

**New Delhi, India:** The PHD Chamber of Commerce and Industry (PHDCCI) has presented ten pivotal recommendations to the Government of India, aimed at expediting the National Green Hydrogen Mission, a groundbreaking initiative with an allocated budget of ₹. 19,744 crores. These PHDCCI recommendations, have been unveiled on the sidelines of the forthcoming 3rd International Climate Summit, slated to occur in New Delhi on September 14 and 15 at Vigyan Bhavan.

These recommendations are of paramount importance as they emerge during a pivotal moment in India's concerted efforts to wholeheartedly adopt more environmentally friendly and sustainable energy alternatives. Launched by Prime Minister Narendra Modi on August 15, 2021, the National Hydrogen Energy Mission aims to make India energy independent and achieve Net Zero emissions by 2070. With an initial outlay of ₹. 19,744 crore allocated for Strategic Interventions, Pilot Projects, and Research & Development, Prime Minister Narendra Modi sees it as a crucial step toward sustainable development and a source of investment opportunities for the youth.

The 10 Recommendations by PHDCCI includes inclusion in Harmonized List of Infrastructure, Zero GST for Green Hydrogen/Ammonia, Nil Basic Customs Duty for Electrolysers and Equipment, Extension of Tax Benefits (Section 115BAB), Recognition of Green Hydrogen Derivatives, Amendment in SEZ Rules, reducing industry

## Rajeev Kumar Singhal selected as next Director (BD) of GAIL

***Rajeev Kumar Singhal*** *has been selected as next Director (Business Development) of GAIL (India) Limited, a Maharatna PSU under the Ministry of Petroleum & Natural Gas (MoPNG). He has extensive experience in business development and marketing related initiatives such as LNG sourcing, trading, shipping, marketing, M&As, diversification projects including RE, Green Hydrogen and Biofuels. He has more than 3 decades of experience, majorly focused on Global Energy Domain and Natural Gas Value Chain. Proven ability to lead M&As and greenfield projects in Energy domain. PESB interviewed ten applicants in the selection meeting from GAIL.*

costs and enhancing global competitiveness, Relaxation in SEZ Rules for RE Plants, Facilitation for Project Development and Exports, Withdrawal of Additional Charges for Power Sale, Capacity Building and Testing Facilities.

"When India took over the presidency of g20 it gave the slogan Vasudhaiva Kutumbakam which means that the world is one family. Our planet is facing unpleasant climatic condition. We must act collectively and swiftly for this and take mindful and constructive actions." said Shri Ram Nath Kovind, Former President of India. "As we advocate for the acceleration of India's National Green Hydrogen Mission, we recognize the critical role it plays in shaping our nation's energy future. The 10 vital recommendations put forth by PHDCCI align with our commitment to advancing sustainable and eco-friendly energy solutions. The National Green Hydrogen's objectives, coupled with these recommendations, hold the promise of not only reducing carbon emissions but also stimulating economic growth and innovation. PHDCCI remains dedicated to collaborating with the government, industry stakeholders, and civil society to usher in a green hydrogen revolution that will define our energy landscape for generations to come," said PHDCCI President Saket Dalmia.

"As we embark on India's National Green Hydrogen Mission, it's imperative to emphasize strategic interventions and the development of Green Hydrogen Hubs. The Strategic Interventions for Green Hydrogen Transition Programme (SIGHT) is a significant step, as it not only supports domestic manufacturing of Electrolysers but also facilitates the production of green hydrogen right here in our nation. Additionally, the identification and development of Green Hydrogen Hubs in states and regions with the capacity for large-scale hydrogen production and utilization are pivotal for our mission's success. These initiatives will not only drive the growth of the green hydrogen sector but also position India as a global leader in sustainable energy solutions, contributing to a greener and more self-reliant future," said Dr. Jeewan Prakash Gupta, Chair of the Environment and Climate Change Committee at PHDCCI.

"This is a very important step in combating climate change and Greenstat is very happy to contribute and share their expertise and experience. It is important for India to collaborate internationally to implement the necessary knowledge in an efficient manner." said Mr Sturle H. Pedersen, Chairman of Greenstat Hydrogen India Pvt. Ltd. Nobuo Tanaka, Chair, the Steering Committee of Innovation for Cool Earth Forum (ICEF), Executive Director Emeritus, International Energy Agency (IEA), CEO, Tanaka Global, Inc. Tokyo, Japan highlights that we are under the global climate and energy crisis, and all countries need to focus on energy security. And green hydrogen are key technologies for climate change mitigation.

## MGL reduces CNG and PNG prices

**Mumbai, India:** Mahanagar Gas Ltd. welcomes the reduction in price of domestically produced High Pressure High Temperature (HPHT) Natural Gas by GOI. This reduction will further promote usage of Natural Gas in general and will contribute to increase in consumption of natural gas in domestic and transportation segment in particular. MGL has always been a customer friendly

## Alok Sharma to be IndianOil Corp Ltd's next Director (R&D)

*Public Enterprises Selection Board Panel (PESB) has selected **Alok Sharma** as the next Director (R&D) of Indian Oil Corporation Limited- a Maharatna oil marketing PSU under the Ministry of Petroleum & Natural Gas (MoPNG). Currently, he is serving as Executive Director (R&D) of IOCL. He has been recommended for the post by the PESB. Alok Sharma joined IOCL's R&D division as Chemical Engineer. He was also a member of first batch which completed the Hybrid Management Program from U21 Global Singapore. Sharma has over 30 years of experience in R&D and Refinery in the areas of process, projects and production. He went to Gujarat Refinery on deputation and has worked for three years in India's first Hydrocracker Unit from 1994-97. Upon return from JR, he worked towards conceiving in establishing the Hydro-processing lab and Resid Block at IOCL R&D.*

company, consistently and promptly passing reduction in gas costs to its consumers to promote usage of Natural Gas. MGL is pleased to announce reduction in CNG price by ₹ 3/Kg and Domestic PNG (DPNG) by ₹ 2/ SCM in and around Mumbai.

The revised MRP of CNG will be ₹ 76.00/Kg and Domestic PNG Rs 47.00/SCM effective from midnight of 1st October 2023/ morning of 2nd October 2023. MGL's CNG now offers attractive savings of more than 50% compared to petrol and almost 20% compared to diesel at current price levels in Mumbai. MGL's Domestic PNG at current MRP is cheaper than Domestic LPG while offering households unmatched convenience, safety, reliability, and environmental friendliness.

## India and Saudi Arabia sign agreement on Cooperation in Energy Sector

**New Delhi, India:** India and Saudi Arabia have signed a Memorandum of Understanding on cooperation in the field of energy. The MoU between the Government of the Republic of India and the Government of the Kingdom of Saudi Arabia was signed in New Delhi on 10th September, 2023, by Union Minister for New & Renewable Energy and Power, Government of India, R. K. Singh for the Indian side and Minister of Energy for the Kingdom of Saudi Arabia, His Royal Highness Abdulaziz bin Salman Al-Saud for the Saudi side.The MoU will develop a stronger partnership between India and Saudi Arabia in the field of energy. The MoU will support India's efforts for energy transition and transformation of global energy system towards combating climate change.

According to the MoU, India and Saudi Arabia will cooperate in the following areas such as Renewable Energy, Energy Efficiency, Hydrogen, Electricity and Grid Interconnection between the two countries, Petroleum, Natural Gas, Strategic Petroleum Reserves and Energy Security, encouraging bilateral investment in the field of Renewable Energy, Electricity, Hydrogen and Storage; and Oil & Gas.

## NTPC Group installed capacity reaches 73824 MW

**Mumbai, India:** India's leading integrated power producer, NTPC's Group installed capacity has reached 73824 MW. This achievement comes in the backdrop of the completion of trial operation of 1st Unit of 800 MW at Telangana Super Thermal Power Project on 5th Sept 2023. This accomplishment reinforces NTPC's commitment to delivering reliable and affordable power to the Nation. With this, the installed capacity of NTPC Limited and NTPC Group has become 57838 MW and 73824 MW

## Shell appoints Mansi Madan Tripathy as the new Country Chair

*Shell India announced the appointment of **Mansi Madan Tripathy** as the new Country Chair of Shell India, effective from October 1, 2023. Mansi will succeed Nitin Prasad who has been Country Chair since 2016. As Country Chair of Shell India, Mansi will oversee Shell Group of companies in India, in addition to her role as Vice President, Shell Lubricants for Asia Pacific. Prior to commencement as Country Chair, Mansi was Vice President of Shell Lubricants Asia Pacific, and has held other roles in Shell including Managing Director of Shell Lubricants India and Country Marketing Officer. Mansi joined Shell from Procter & Gamble in 2012, where she held several regional and global Director-level positions.*

respectively. Further, the company is committed to achieve 60,000 MW of Renewable Energy capacity by year 2032. NTPC Ltd. is India's largest integrated power utility, contributing 1/4th of the power requirement of the country. With a diverse portfolio of thermal, hydro, solar, and wind power plants, NTPC is dedicated to delivering reliable, affordable, and sustainable electricity to the Nation. The company is committed to adopting best practices, fostering innovation, and embracing clean energy technologies for a greener future.

## REC Limited signs MoU with PNB


**Gurugram, India:** REC Limited signed an MoU with Punjab National Bank (PNB) to jointly explore the possibility to fund the Power Sector and Infrastructure & Logistics Sector projects under the consortium arrangement. REC and PNB will associate with each other to co-finance loans amounting to ₹. 55,000/- crore over next three years. T.S.C Bosh, Executive Director (Infra & Logistics), REC and Rajeeva, CGM (Corp. Credit Division), PNB signed the MoU in the presence of Ajoy Choudhary, Director Finance, REC; V K Singh, Director Technical, REC and other senior officials from REC and PNB.

REC Limited, a Maharatna CPSE established in 1969, under Ministry of Power, provides long term loans and other finance products for Power-Infrastructure sector comprising of Generation, Transmission, Distribution, Renewable Energy and new technologies like Electric Vehicles, Battery Storage, Green Hydrogen etc. More recently REC has also diversified into the Non-Power Infrastructure sector comprising of Roads & Expressways, Metro Rail, Airports, IT Communication, Social & Commercial Infrastructure (Educational Institution, Hospitals), Ports and Electro-Mechanical (E&M) works in respect of various other sectors like Steel, Refinery, etc. The loan book of REC exceeds ₹. 4,54,393 Crore. Punjab National Bank (PNB), is a Public Sector Bank and doing banking Business across the Country with worldwide presence including funding the infrastructure Projects. Founded in 1894, PNB is one of the largest Public Sector Banks (PSB) in the country with Global Gross Business at ₹. 22,14,741 Crore.

## Tata Power Renewable Energy ties up with Dugar Power to accelerate Nepal's Renewable Energy initiatives

**Mumbai, India:** Tata Power Renewable Energy Limited (TPREL), one of the country's most significant renewable energy players has signed an agreement with Dugar Power Private Limited (Dugar Power), a subsidiary of Dugar Group which is a prominent business house in Nepal. This tie up heralds TPREL's strategic entry into Nepal's rapidly evolving renewable energy sector and sets the stage for a quantum leap in accelerating Nepal's shift toward sustainable energy. TPREL is a subsidiary of The Tata Power Company Limited, one of India's largest integrated power companies. This alliance empowers Dugar Power to achieve a significant milestone in integrating cutting-edge sustainable energy solutions within Nepal.

The partnership is set to deploy transformative solar technologies to produce a range of on and off-grid energy solutions.Engineered for adaptability, this collaboration marks the inception of a long-term commitment to energy sustainability in the region. The agreement is designed to cater to Nepal's diverse energy requirements, offering scalable solutions from 1 KW to MW levels. This opens up new horizons for TPREL to diversify its offerings, including supply cells & modules, Engineering, Procurement, and Construction (EPC), as well as Operations and Maintenance (O&M) in Nepal.

Ashish Khanna, CEO of Tata Power Renewable Energy Limited., said, "This partnership with Dugar Power is a strategic alliance engineered to redefine Nepal's energy landscape. As we make our entry into Nepal's promising renewable energy market, we intend to generate a transformative impact. With the combined expertise and resources of both companies, we are optimistic that this tie up will create an enabling ecosystem for sustainable energy transition in the region."

Abhishek Dugar, MD of Dugar Power Private Limited, commented, "Our alliance with Tata Power Renewable Energy Limited is a strategic alignment in achieving

Nepal's long-term objectives for renewable energy and energy self-sufficiency. Our collective aim transcends commercial interests; we are committed to ensuring that clean energy reaches every corner of Nepal. This partnership is a testament to our unwavering commitment to propel Nepal toward a sustainable energy future."Tata Power Renewable Energy Limited is a leading player in the renewable energy sector, having globally shipped over 3GW of cells and modules. The company has powered some of the biggest industry and utility-scale international projects like 3.411 MWp in the Netherlands, and 3.376 MWp in the USA, to name a few. Dugar Power complements this with its specialized expertise in Nepal's renewable energy landscape. Together, they form a synergistic alliance with the capability to transform energy solutions in Nepal. This partnership transcends conventional business collaborations; it is a visionary endeavour with the strategic intent to reshape Nepal's renewable energy sector. Both Tata Power Renewable Energy Limited and Dugar Power Pvt. Ltd. are strategically positioned to elevate Nepal's energy landscape to unparalleled heights.

## bp enters third long-term liquefied natural gas offtake contract from Woodfibre's British Columbia LNG facility

**London, UK:** bp has entered its third long-term liquefied natural gas (LNG) offtake contract from the Woodfibre LNG facility based in British Columbia, Canada. With the additional contract to offtake 0.45 million tonnes of LNG per year (mtpa) for 15 years on a free on board (FOB) basis, all of the LNG production from the Woodfibre LNG export facility is now committed for sale to bp, with firm offtake totalling 1.95 mtpa and the remainder on a flexible offtake basis. bp continues to look for opportunities across the gas value chain, as it sees LNG as an essential part of the energy transition and its own pivot to becoming an integrated energy company. As bp works towards building an LNG portfolio of 30 million tonnes by 2030, the additional Canadian west coast supply source expands bp's flexible, high-quality LNG portfolio and further enhances the company's capability to meet the growing global natural gas demand.

In addition to securing LNG offtake rights from the project, bp will provide safe and reliable transportation of gas to the Woodfibre LNG export facility during the 15-year contact term. Jonathan Shepard, VP global LNG trading and origination at bp, said: "As the world seeks secure, affordable and lower carbon energy, global demand for LNG is expected to continue to grow and this additional Canadian supply source will further enhance bp's supply positions in the Pacific region. We look forward to continuing our close collaboration with Woodfibre LNG."

## Adani Green Energy signs agreement with TotalEnergies

**Ahmedabad, India:** Adani Green Energy Limited (AGEL) and TotalEnergies have entered into a binding agreement to create a new JV, equally owned by TotalEnergies and AGEL, with a 1,050 MW portfolio. This portfolio will comprise a mix of already operational (300 MW), under construction (500 MW) & under development assets (250 MW) with a blend of both solar & wind power. AGEL will contribute to the JV the assets and TotalEnergies an equity investment of 300 MUS$ which will further support their development. TotalEnergies will reinforce its strategic alliance with AGEL and support the company in becoming the Indian leader of renewable energy, with a target of 45 GW renewable power capacity by 2030.

Adani Group Chairman, Gautam Adani, commented; "We are delighted to extend our long-term partnership with TotalEnergies in AGEL. The investment will further strengthen the pivotal role played by AGEL in India's glide path to decarbonization. This will help deliver our vision to have 45 GW renewable energy capacity by 2030." TotalEnergies' Chairman and CEO, Patrick Pouyanné, commented; "TotalEnergies has been actively developing, notably through AGEL, its presence in the Indian renewable power market, a very interesting market by its size and growth and the early development of a merchant market. After our first joint-venture AGEL23 in 2020 and our acquisition of shares in AGEL in 2021, this new joint-venture with AGEL will enable us to speed up our development through direct access to a large portfolio of assets and to support the ambition of AGEL in becoming the Indian leader of renewable energy." The completion of the transaction shall be upon satisfaction of customary closing conditions including the receipt of certain regulatory approvals.

## Halliburton introduces Intelevate, new data science-driven platform

**Houston, USA:** Halliburton Company introduced Intelevate, a new data science-driven platform that helps operators design, build, and operate end-to-end electrical submersible pump (ESP) monitoring solutions. This application can be customized for specific needs. The Intelevate platform from Summit ESP®– A Halliburton

Service - seamlessly integrates historical engineering and performance data with active operational information to provide a holistic view of an operator's ESP system. The service intelligently processes, analyzes, and models production data with real-time visualization and reporting to develop a comprehensive optimization plan, including remote changes and interventions, to achieve production goals. "The Intelevate platform uses existing data, artificial intelligence and machine learning along with real-world experience to provide accurate predictions, insights, and potential solutions for critical business decisions," said Greg Schneider, vice president for Artificial Lift. "With the Intelevate platform, we support safe and sustainable ESP operations by delivering extensive, customizable technical well monitoring and optimization solutions, allowing us to maximize the asset value for our customers."

This transformative service enables Halliburton to provide a collaborative experience that enhances the customer's decision making for current and future ESP system optimization. Halliburton also provides dedicated petroleum engineers, field technicians, and application engineers who are on call to provide monitoring support around the clock as part of the mission to add the greatest asset value for the customer. The Intelevate platform improves sustainability with remote operations and increases value creation with digital solutions, artificial intelligence, and machine learning.

## NLC India signs Power Purchase agreement with GRIDCO for 800MW


**New Delhi, India:** NLC India Limited (NLCIL) under the Ministry of Coal and GRIDCO Limited signed a Power Purchase Agreement (PPA) in GRIDCO Limited , Bhubaneswar for 400MW in Stage-1 and 400 MW in Stage-2 of NLCIL's proposed Neyveli Talabira Super Critical Thermal Power Station (NTTPP) in Odisha. With this agreement, NLCIL has tied up its full capacity of 2400 MW of Neyveli Talabira Super Critical Thermal Power Station Stage-I.

In the presence of M. Prasanna Kumar Motupalli, Chairman & Managing Director (CMD), NLC India Ltd and Shri Trilochan Panda, Managing Director, GRIDCO Limited and Gagan Bihari Swain, Director (F&CA), GRIDCO Limited, the Power Purchase Agreement was signed by M Venkatachalam, Director/Power, NLC India Limited and Umakanta Sahoo, Director (T&BD), GRIDCO Limited.

NLCIL has already signed a similar agreement in the past with Tamil Nadu, Kerala and Pondicherry for 1,500 MW, 400 MW, and 100 MW power supply respectively from Neyveli Talabira Super Critical Thermal Power station Stage-I and in the second phase of 1x800 MWcapacity of NTTPP, 400MW is tied up now with GRIDCO Odisha.

## Prime Minister dedicates first 800 MW Unit of Telangana Super Thermal Power Project of NTPC to the Nation

**New Delhi, India:** The Prime Minister, Narendra Modi dedicated the first 800 MW Unit of phase 1 of Telangana Super Thermal Power Project of NTPC dedicated to the nation, at a programme in Nizamabad, Telangana. The project, situated in Peddapalli district, will provide low-cost power to Telangana and provide a boost to the economic development of the state. It will also be one of the most environmentally compliant power stations in the country. Addressing the gathering, the Prime Minister congratulated the people of Telangana and said that the development of any nation or state depends upon its self-reliant capacity for electricity production as it improves Ease of Living and Ease of Doing Business simultaneously. "Smooth supply of electricity gives momentum to growth of industries in a state", the Prime Minister remarked. He emphasized that the second unit of the project will also be operational very soon, and upon its completion, the installed capacity of the power plant would rise to 4,000 MW.

The Prime Minister expressed happiness over the fact that the Telangana Super Thermal Power Plant is the most modern power plant out of all NTPC power plants in the country. "The major part of electricity produced in this power plant will go to the people of Telangana", the Prime Minister said as he emphasized the central government's efforts to complete completing the projects

whose foundation stones are laid. He recalled laying the foundation stone of this project in 2016 and expressed gratitude for inaugurating it. "This is the new work culture of our government", he added. The Prime Minister said that the government is working to fulfill the energy needs of Telangana.

Phase I of Telangana Super Thermal Power Project of NTPC is being established at an approved cost of ₹ 10,998 crore on the available land in the premises of NTPC's existing Ramagundam station in Peddapalli district. It will supply 85% of its power to the state of Telangana. This project will also help the state of Telangana with low-cost power. Further, this being the most efficient power station of NTPC in India, this will reduce specific coal consumption (Total consumption of coal per unit of power generated) and CO2 emissions, making it one of the most environmentally compliant power stations in India.

## L&T bags Order for its Power Business

**Mumbai, India:** The Power business arm of Larsen & Toubro (L&T Energy – Power) has secured Engineering, Procurement and Construction (EPC) order from West Bengal Power Development Corporation Limited to set up wet Flue Gas Desulphurization (FGD) systems for its Thermal Power Plant at Sagardighi in the state of West Bengal. The project's unique features include three FGD absorbers catering to four thermal power units (2x300 MW, 2x500 MW) while balance of plant systems to be installed shall cater to five units of the plant. For L&T, this will be the first FGD project from a state-owned power utility.

Installation of FGD systems in existing and upcoming thermal power plants has been made mandatory by Ministry of Environment, Forest and Climate Change, Government of India, to curtail SO2 emissions. With this order, L&T is poised to install FGD projects for thermal plants totaling more than 19 GW, actively contributing to GoI's initiative of reducing SO2 emissions.

## Ministry of Power reviews impact of flash floods in Teesta Basin, Sikkim on Central Hydro Power Projects

**New Delhi, India:** The Power Ministry is continuously monitoring the situation arising out of flash floods in Teesta Basin in Sikkim. Pankaj Agrawal, Secretary (Power) held an emergency meeting with NHPC wherein senior officers of the Ministry of Power and Central Electricity Authority were also present.

Due to flash floods in the Teesta Basin in the intervening night of 3rd and 4th October 2023, all the bridges downstream to Teesta-V Hydropower Station upto Tarkhola/ Pamphok have been submerged/ washed out thus severely affecting commutation and communication in these areas. The flood water over topped the Dam of Teesta V Power Station (510 MW). All connecting roads to the project sites as well as parts of residential colony have been severely damaged. Presently, the power station is under shutdown and not generating electricity. NHPC had timely evacuated the manpower on all its projects and ensured that they are shifted to safer places. However, one casualty is reported from Teesta V power station.

Ongoing works of under construction hydro project Teesta VI (500 MW) of NHPC have been disrupted. The flood water had entered into power house and transformer cavern. Bridges connecting right and left banks at the barrage as well as Power House have been washed out. Two crane operators working at the project site are reported missing. All efforts are being made to trace them.

No major damages have been observed in TLDP-III (160 MW) (Teesta Low Dam - III Hydropower Plant) and TLDP-IV (132 MW) power stations located in the downstream West Bengal state. Both the power stations are safe but kept in shut down condition due to heavy siltation brought along with the flood water. NHPC is constantly trying to start the electricity generation in both the projects in coming days. Also, no damage is reported in Rangit valley where NHPC's Rangit IV power project (120 MW) is under construction and Rangit Power Station (60 MW) is under operation.

The quantum of damage at all the projects sites will be assessed in detail after the water level recedes. NHPC is making all possible efforts with the help of the state government, disaster management authorities and district administration to maintain the supply of essential commodities like food, medicine, electricity etc. in the affected regions.

## Cadila backed IRM Energy commences PNG distribution in Diu


**Diu, India:** IRM Energy Limited, a city gas distribution ("CGD") company has started Piped Natural Gas ("PNG") supply in Diu, Union Territory of Daman and Diu. IRMEL has started to supply PNG to homes and commercial establishments as on this day. The supply of fuel PNG marks a milestone in IRMEL's public service and connecting end consumers through natural gas pipeline services. The hotels and restaurants located in Diu will also be benefitted by the PNG supply, which is an additional and an eco-friendly substitute over conventional fuels like LPG, diesel and wood.

The PNG supply was inaugurated by Maheswar Sahu (Retd. IAS officer) - Chairman of IRMEL in the presence of Shri. Vivek Kumar - Additional District Magistrate of Diu, Prashant Sagar - Chief Operating Officer of IRMEL, Harshal Anjaria – Chief Financial Officer of IRMEL, Diu PWD Officers and customers. Employees and the senior management team of IRMEL were also present at the inaugural ceremony. Collector of Diu, Bhanu Prabha, IAS has appreciated & congratulated IRMEL for this milestone and has urged Diu's residents, hotels and restaurants to take maximum benefits of natural gas as it is safe, uninterrupted and economical as compared to LPG.

It shows IRMEL's commitment to a sustainable future aligning with the ambitious Smart City objectives set out for Diu. Availability of such facility will enhance the quality of life for the residents of Diu by ensuring a reliable, and eco-friendly fuel for kitchens. This milestone towards the vision of Hon'ble Prime Minister of India, Shri Narendra Modi for a Gas based Economy. To encourage residents in Diu to adopt Piped Natural Gas (PNG), IRMEL is offering a domestic PNG connection at a nominal monthly rental of Rs. 30 per month – a rental of Rs. 1 per day. Supply of PNG through a network of gas pipelines will provide enhanced convenience to residential and commercial customers of Diu.

IRMEL (a group Company of Cadila Pharmaceuticals Limited) is an integrated value driven energy enterprise, developing Natural Gas distribution projects across various districts in the country for industrial, commercial and domestic customers.

As of June 30, 2023, IRMEL is supplying gas to more than 52,000 domestic customers, 260 commercial customers, 180 industrial customers and has a network of 66 CNG filing stations for supplying Compressed Natural Gas (CNG) across various Geographical Areas of Banaskantha District in Gujarat, Fatehgarh Sahib District in Punjab, Diu and Gir Somnath District in U.T of Daman & Diu and Gujarat and Namakkal and Tiruchirappalli Districts in Tamil Nadu.

## Global gas demand is set for slower growth in coming years: IEA

**London, UK:** After a decade of unprecedented expansion, growth in global demand for natural gas is expected to slow in the coming years as consumption declines in mature markets, according to the IEA's new medium-term forecast. Global gas demand is on course to grow by an average on 1.6% a year between 2022 and 2026, down from an average of 2.5% a year between 2017 and 2021, says the Gas 2023 Medium-Term Market Report. The report notes that the advent of the global energy crisis in 2022, triggered by Russia's invasion of Ukraine, has ushered in a different era for global gas markets after their decade of strong growth between 2011 and 2021. Overall gas demand from mature markets in Asia Pacific, Europe and North America peaked in 2021, and is forecast to decline by 1% annually through to 2026, according to the report. An accelerated rollout of renewables and improved energy efficiency are among the key drivers behind the downward trend for natural gas in these markets. For Europe, the loss of piped gas from Russia, following its invasion of Ukraine, pressed governments to seek alternative solutions to maintain energy security.

Decreasing demand in mature markets across the world – a collection of countries that represents almost half of global gas consumption – means that growth will be highly concentrated in fast-growing Asian markets as well as some gas-rich economies in the Middle East and Africa. China alone is expected to account for almost half of the total growth in global gas demand between 2022 and 2026, drawing on the fuel to serve its industrial production, power sector and urban areas. ■

## ONGC inks MoU with NTPC Green Energy for Development of Renewable Energy Projects


**New Delhi, India:** Oil and Natural Gas Corporation (ONGC) inked Memorandum of Understanding (MoU) with NTPC Green Energy Limited (NGEL) to realize its Renewable energy objectives towards energy transition on 27 September 2023. The MoU will primarily explore the feasibility and setting up of Renewable Energy Projects in various domains.The MoU was signed by ONGC Executive Director Debdulal Adhikari (left) and CEO (NGEL) Mohit Bhargava in the presence of ONGC Chairman & CEO Arun Kumar Singh and NTPC Limited Chairman and Managing Director & CEO Gurdeep Singh. The MoU envisages collaboration of the two mega entities in Renewable Power Projects in India and Overseas through offshore wind projects and exploring opportunities in the Storage, E-mobility, Carbon Credits and Green Credits, Nuclear, Green Hydrogen business and its derivatives (Green Ammonia and Green Methanol).

## Oil India plans to invest ₹ 25,000 crore for net zero by 2040

**Noida, India:** State-owned Oil India Ltd is planning to invest ₹ . 25,000 crore in clean energy projects, which will help it achieve a net zero carbon emission goal by 2040, Dr Ranjit Rath, Chairman & Managing Director (CMD) said in his address to the shareholders. Dr Rath highlighted that following the clarion call of the Prime Minister, OIL has set for itself an ambitious target of transforming itself to a 'Net-Zero' emission company by 2040 through a range of initiatives, including adopting cleaner energy sources, investing in renewable energy projects and implementing advanced technologies.

Dr Rath in his address highlighted the achievements of the OIL on various fronts including the production of Crude Oil and natural gas which recorded a growth of 5.5% (3.18 MMT) and 4.4% (3.18 BCM) respectively. The company registered the highest-ever standalone profit after tax (PAT) in FY 2022-23 at ₹6,810 crore, a growth of 75.20% YoY while the consolidated PAT was also the highest ever at ₹ 9,854 crore, a growth of 46.66% YoY.

Dr Rath mentioned that marching towards fulfilling the vision of UrjaAtmnirbharta for a New India, OIL's strategy is to consolidate its position as the leading operator in the country with the long-term vision to supplement the existing domestic reserves portfolio in line with the Government of India's vision to intensify exploration in Indian Sedimentary Basins and increase domestic oil and gas production. The Company has increased its total operating acreage to 62,911 Sq Km. Aggressive exploration of the company led to a new hydrocarbon discovery during the year in the Sesabil area in the Assam Shelf Basin. OIL has 2P reserve base of 191 MMTOE and 51 MMTOE of Oil & Oil Equivalent of Gas respectively in domestic assets and overseas assets.

## NGEL to collaborate with Nayara Energy for Production of Green Hydrogen


**Mumbai, India:** NTPC Green Energy Limited (NGEL), a wholly-owned subsidiary of India's leading integrated power producer NTPC Limited, and Nayara Energy, a new-age international downstream Energy Company of International scale, have entered into a Memorandum of Understanding (MoU) to explore opportunities in the Green Hydrogen and Green Energy space. The MoU signing ceremony was attended by Mohit Bhargava, CEO, NGEL and Amar Kumar, Head-Technical, Nayara Energy. Other senior officials of NTPC, NGEL and Nayara Energy were also present on the occasion.

The MoU envisages to collaborate and produce Green Hydrogen for Nayara Energy's captive usage, accelerate decarbonisation and catalyse reduction in carbon footprint. This collaboration is in line with NTPC's initiatives to develop hydrogen projects in India and aligns with the vision of a self-reliant India (Atmanirbhar Bharat) as laid out by the Hon'ble Prime Minister. Mohit Bhargava, CEO (NGEL) mentioned that "Green Hydrogen would be a crucial element of India's clean energy future, and with this partnership, we will explore and implement cutting-edge technologies to produce Green Hydrogen, contributing to a cleaner and more resilient energy landscape. Through NGEL, we are dedicated to expanding our Green Energy portfolio, and this collaboration exemplifies our relentless pursuit of a greener and more sustainable future for the nation. While appreciating the efforts of NTPC for Green Hydrogen, Dr Alois Virag, CEO, Nayara Energy has communicated that, "As a prominent player in the energy industry, environmental sustainability is deeply ingrained in all our business operations at Nayara Energy. Today, we take an important step forward by partnering with NTPC, leaders in Green Energy business, to explore the potential of Green Hydrogen. This collaboration will contribute to achieve the energy transition objectives of the country."

NTPC is India's largest Power Utility having a total installed capacity of 73+ GW. As part of increasing its RE portfolio, a wholly-owned subsidiary NGEL has been formed to take up Renewable Energy Parks and Projects including businesses in the area of Green Hydrogen, Energy Storage Technologies, and Round-the-Clock RE Power. NTPC Group has a plan of 60 GW of RE capacity by the year 2032 and currently working on a pipeline of 20+ GW, out of which over 3 GW is operational capacity. Nayara Energy is an integrated downstream company of international scale with strong presence across the hydrocarbon value chain from refining to retail. Nayara Energy owns India's second largest single-site refinery at Vadinar, Gujarat with a capacity of 20 MMTPA. It is one of the world's most modern and complex refineries with a complexity of 11.8, which is amongst the highest globally. The company has over 6,000 operational retail outlets spread across India.

## IREDA signs MoUs with Bank of Maharashtra for financing renewable energy Projects

**New Delhi, India:** Indian Renewable Energy Development Agency (IREDA), a Mini Ratna (Category – I) Government of India enterprise under the administrative control of Ministry of New and Renewable Energy, has signed a significant Memorandum of Understanding (MoU) with Bank of Maharashtra (BoM) on September 18, 2023. This collaboration aims to promote and facilitate co-lending and loan syndication for a diverse spectrum of Renewable Energy projects across the nation. The MoU comprises several services including co-lending and co-origination support for all Renewable Energy projects, facilitating loan syndication and underwriting, management of Trust & Retention Account for IREDA borrowers, and a commitment to establishing stable fixed interest rates spanning a period of 3-4 years for IREDA borrowings. Under this agreement, Bank of Maharashtra can invest in the Bonds issued by IREDA in accordance with the specified terms and conditions of the offering.

Speaking on the collaboration, IREDA CMD Das said: "This MoU with Bank of Maharashtra is another significant step in our ongoing efforts to promote Renewable Energy adoption in India. By joining forces, we aim to provide a robust financial ecosystem for Green Energy projects, making clean and sustainable energy accessible to more communities and industries. The partnership underscores the importance of Financial Institutions and Government Agencies working together in line with country's goal to achieve India's goal of Net Zero emissions by the year 2070, the target set by the Hon'ble Prime Minister."

## Sterling and Wilson Renewable Energy wins new order of ₹ 1,535 crore from NTPC REL in Khavda, Gujarat

**Hyderabad, India:** Sterling and Wilson Renewable Energy Limited (SWRE) has received the Notification of Award for the EPC project of 300 MWc of NTPC Renewable Energy Limited (NTPC REL) at Khavda RE Power Park, Rann of Kutch, Gujarat. The total Contract Price, including O&M for 3 years, would be ₹ 1,535 crore (inclusive of taxes). This is the third order for SWRE from NTPC REL in just over a year. This 300 MW project is synergistically located between the first two projects won. The formal contract signing is likely to happen in due course.

Amit Jain, Global CEO, Sterling and Wilson Renewable Energy Group said, "We are delighted to win and partner again with NTPC Renewable Energy. The continued partnership further demonstrates the trust and leadership of SWRE's project management capabilities and global expertise. The new order win of 300 MWac complements our existing portfolio of ~2.47 GWac currently under execution for NTPC REL in Khavda and helps us leverage the low module price environment globally." "With this order, our year-to-date order booking stands at ₹ 3,100 crore. The domestic order pipeline continues to remain strong and we're confident of surpassing the FY 2023 order booking in this financial year. Over the past decade, we have been a dominant player in the domestic market and are poised to delivering high-quality renewable solutions that drive sustainability and make a positive impact on the world and look forward to spearheading the journey with continuous growth and innovation", he added.

## Assam govt gives approval to ₹ 5,197-cr project for power sector modernisation-projects

**Assam, India:** The Assam government gave the approval to a ₹ 5,197-crore project towards modernisation of the power distribution system across the state. The Cabinet approved detailed project report (DPR) in its meeting chaired by Chief Minister Himanta Biswa Sarma and the total DPR cost is estimated to be ₹ 5,196.91 crore. The project is expected to be completed by 31 March, 2026. The council of ministers added that a power purchase agreement would be executed for 100 MW at rates offered by Solar Energy Corporation of India (SECI).

## Exide's lithium-ion cell project secures ₹ 2,000 crore credit from banks

**Kolkata, India:** Exide Industries' ₹ 6,000 crore lithium-ion cell manufacturing project has received a line of credit of ₹ 2,000 crore from banks. The lenders ICICI Bank, HDFC Bank, Axis Bank, HSBC Bank, and Kotak Mahindra Bank will extend the credit facility to Exide Energy Solutions. The total project capacity of the project is 12 GWh, and it includes first phase of six GWh, with an investment of ₹ 4,000 crore. The maximum liability of the Company under the guarantee outstanding as on date is ₹. 2000 crore. ■

GUEST COLUMN

# The Other Way Around: A Virtuous Circle to Decarbonize

**PRASAD CHANDRAGIRI**
Head of Innovation and Strategy,
Projects & Energy Solutions Business, Thermax Ltd

India's oil consumption is expected to rise from 5 million barrels/day (MBD) in 2020 to 7.2 MBD in 2030 and 9.2 MBD in 2050. Oil refineries are major consumers of energy and hence emitters of $CO_2$, with complex refineries producing fuels emitting up to 0.2-0.3 tons of $CO_2$ per ton of crude processed, only counting Scope 1 emissions. These emissions can double or triple if a refinery is associated with petrochemical units. For any complex refinery, there are multiple $CO_2$ emission spots such as Hydrogen Generation Unit (HGU), Fluid Catalytic Cracking (FCC), Crude Distillation Unit (CDU) / Vacuum Distillation Unit (VDU), Power/Co-Gen Plant (PP/CGP) and Heaters. **Prasad Chandragiri** talks about ways to reduce $CO_2$ emissions in refining and petrochemical.

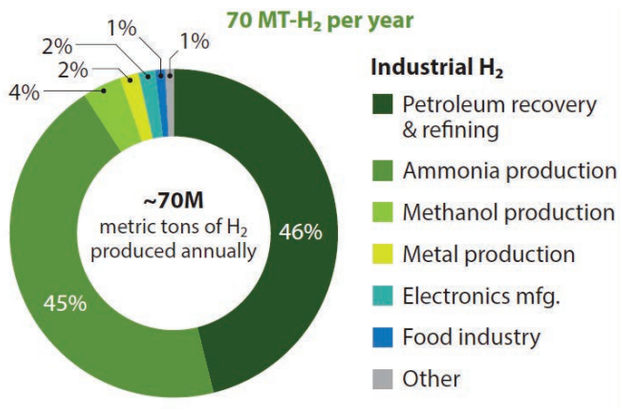
Though the downstream refining and petrochemical industries resolve to reduce $CO_2$ emissions along with an objective to increase their production capacity with multiple new facilities. The question that arises is how these two contradictory objectives can work in tandem with each other.

The Paris Agreement set ambitious goals with respect to reducing global warming and in the Paris Agreement concertation, governments have acted, as have major oil and petrochemical companies. Once finalized, the Indian Carbon Market will help India in achieving the Nationally Determined Contributions goal of reducing the Emissions Intensity of the GDP by 45 percent by 2030 against 2005 levels. Most major oil and petrochemical companies have set similar goals with some aiming for net zero $CO_2$ emissions by 2050.

Determining which roadmap to adopt to decarbonize an existing oil refinery is a complex exercise. It is technically possible to decarbonize an oil refinery by implementing any of these 4 levers: Energy Efficiency, Electrification, Green $H_2$ and $CO_2$ capture and Utilization (CCU). Petrochemical space can be decarbonized by using biomass/biochemical as feedstock. On the other hand, the cost of decarbonizing the refinery needs to be considered with the only anticipated benefit being Carbon Credits or government grants/incentives, the monetary value of which is subject to varying dynamics.

Thermax has conducted multiple desktop studies investigating the effects of a number of decarbonization options:

- CCU including converting $CO_2$ with hydrogen to e-methanol, 3G-ethanol, SNG or chemicals,
- Bio-chemicals like Ethylene Oxide (EO) / Ethylene Glycol (EG) from Bio-ethanol,
- Blue and Green $H_2$ from alternate feedstocks like biomass.




Additionally, Thermax's Energy Management Services (EMS) team is extensively working with customers on ESCO models where an emphasis on energy efficiency and plant performance is addressed.

**Hydrogen** is the pathway for a cleaner energy future. Hydrogen is a high density energy carrier for thermal energy, or as a feedstock for industrial processes. So, the production of hydrogen is a key consideration for its role in the evolving energy system and its potential impact on mitigating GHG emissions. The hydrogen market is large with each million ton per annum (MMTPA) capacity of a refinery requires nearly 15,000 Nm3/hr of hydrogen. 46% of the global $H_2$ production today is consumed by refineries and another 49% by ammonia and methanol production.

The SMR process and the hydrocarbon feedstock is the common factor in the production of hydrogen for refineries, ammonia, and methanol. The intervention of Green $H_2$ in refineries would enable this hydrocarbon feedstock to be diverted to cracker units for production of high-value revenue streams like Propylene, Maleic Anhydride, MEG, etc. in petrochemical units and industrial plastic parks like the one conceptualized for IOCL Paradeep.

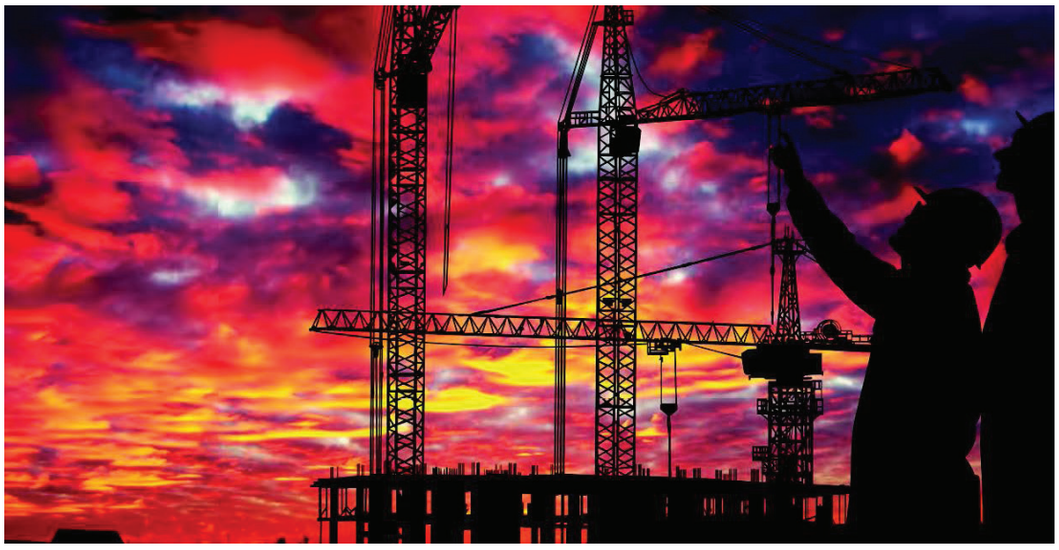
**The bottlenecks for Green $H_2$ are the following:**

- Economic viability
- Round-the-Clock Green Power

The significant cost for Green $H_2$ production is the energy cost and following which the $H_2$ produced is not competitive against current $H_2$ sources. Therefore, the need for alternate sources for non-fossil based H2. The feedstock for renewable $H_2$ needs to be extended to other sources like biomass.

The gap between Green $H_2$ and Grey $H_2$ needs to be bridged through a transitional $H_2$ source. That's how Blue $H_2$ can become a bridge for this gap by introducing a $CO_2$Capture step in the conventional SMR process to remove the $CO_2$ and stored underground or utilised for producing other products.

For Process Industry in general, which use coal as a fuel, **Coal Gasification** with an integrated CCU unit can cater to the Blue $H_2$ requirement till Green $H_2$ sources are viable. Thermax has developed a Coal Gasification technology solution that is unique for its capability to handle high-ash Indian coal. Primary chemicals from HGU generated syngas include $H_2$, methanol, ammonia. These chemicals can alternatively now be produced from



Coal through the gasification pathway or through CCU pathways. For example, the Jamnagar refinery of Reliance Industries has a 10 MTPA of petcoke gasification facility for syngas generation and its use in power generation and downstream products.

**CCUS or $CO_2$ Capture, Utilization & Storage** has a critical role to play in decarbonizing the industrial sector, which is hard to electrify and hard to abate, due to the use of fossil fuels not only as a source of energy but within the process itself. India's ¬¬current $CO_2$ emissions from refinery ¬and petrochemicals are nearly around 200 MTPA and are expected to grow significantly at a CAGR of around 6%.

**Biofuels** are regarded as a Greener alternative for producing sustainable and synthetic fuels. Ethanol is one of the principal biofuels, which is produced by the fermentation of sugars by yeasts. Currently, about 12% Ethanol Blended Petrol has already been achieved, and the target is to reach 20% by 2025. To expand Ethanol production capacity, all possible pathways have opened up - from feedstocks such as sugar syrup, molasses, grain, maize etc (1G ethanol), from non-food based feedstocks such as agro-wastes, energy crops etc. (2G ethanol), and from industrial waste gases (3G ethanol) has to be expanded at a large scale.

The aviation sector is gaining a larger attention for decarbonization. **Sustainable Aviation Fuel (SAF)** is a drop-in fuel and is the most feasible element to decarbonize the aviation sector with multiple underlying principles on synthesis. Among alternate pathways for SAF, Ethanol-to-SAF is the most promising. The SAF produced from ethanol is rich with 99.8% of iso-paraffin and allows blending up to 50% v/v. Hence, biomass is the future syncrude for producing sustainable and synthetic fuels.

Ethanol from biomass is also raising interest from petrochemical and chemical industries who are shifting toward **bio-chemicals** as an avenue for decarbonization, starting with Ethylene, EO and EG manufacturers. Thermax has been working on these prospects to create value propositions for customers in their decarbonization journey.

**Electrification** is definitely the strongest pillar for decarbonization. Thermax recently launched Thermotron, an electric boiler for process heating applications. Moving ahead the space for electrification will advance with a larger pace and scale to meet the requirements of all heavy industries.

## Conclusion

Based on the $CO_2$ emission intensities for various process units in the refinery and petrochemical sector, Blue $H_2$ and Green $H_2$ will be the first levers for decarbonization after energy efficiency. HGU/SMR must be integrated with a $CO_2$ capture unit to reduce a significant $CO_2$ footprint. Captured $CO_2$ can further be utilized to produce revenue streams like methanol, 3G-ethanol, SNG, acetic acid, and DHA fatty acids.

Bio-assisted processes are to be put into practice for greener products. For instance, a mixture of $CO_2$ and $H_2$ in the presence of certain biological stains can produce acetic acid and DHA Omega-3s fatty acids. These high-value chemicals can ensure the economic viability of these technologies. Similarly, biofuels which are regarded as a sustainable syncrude will help in decarbonizing the transportation and aviation industry. ■

# Power-to-X: Opportunities, Challenges and Global Adoption

**Mithu Saha** explores the role of Power-to-X (P2X) technologies in addressing the challenges of renewable energy integration, decarbonization, and achieving a net-zero carbon emissions future. He also emphasizes about the present demand scenario of Power-to-X technology and countries that have emerged as leaders in incorporating and advancing P2X technologies.

There is a revolutionary concept gaining traction as key to the transition of a more sustainable energy landscape. Power-to-X (P2X). The term encompasses a diverse set of technologies that share a common goal: to convert surplus renewable energy into various forms of energy carriers. These energy carriers include hydrogen, synthetic fuels, and chemicals.

The core principle behind P2X is to capture and convert excess renewable energy generated during periods of high production. The energy carriers provide a mechanism to store energy and make it available when demand exceeds supply.

The value of P2X is its ability to address some pressing challenges associated with renewable energy sources. The greatest qualms opponents of renewable energy cite are intermittency, and storage. Wind and solar, the most used renewable energy generation types, rely on certain weather conditions. Storing excess energy when weather conditions are optimal is critical for a reliable energy supply.

By transforming surplus renewable energy into energy carriers, P2X effectively serves as a bridge between intermittent renewable energy sources and consistent energy demand. This not only enhances the reliability and stability of the energy grid but also creates new opportunities for sectors that traditionally rely on non-renewable energy sources.

In theory it sounds good, but, does Power-to-X provide real hope for us to save our planet, or is it just a pipe dream?

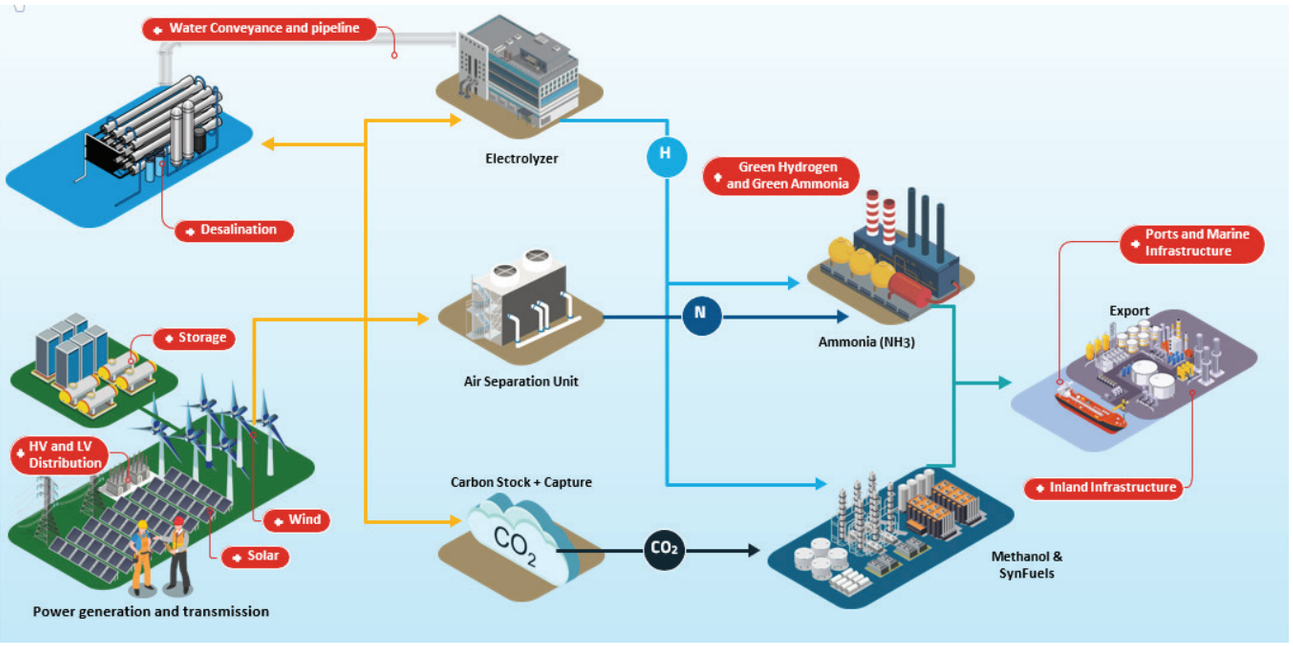
### How does Power-to-X help in decarbonization and how will it help to achieve Net-Zero?

We have been made increasingly aware of the detrimental effects emissions pose to the climate and in turn our environment. Renewable energy reduces carbon emissions from electricity generation. However, certain sectors such as heavy industries, aviation, and shipping find it challenging to directly integrate renewable energy into their operations. P2X offers players in these sectors a solution to their overarching mission of decarbonization and ultimate goals to achieve net-zero.

By producing energy carriers like hydrogen and synthetic fuels through P2X technologies, heavy industry sectors can transition away from carbon intense fuels. Hydrogen, for instance, can be used as a clean fuel for industrial processes and transportation, emitting only water vapor during combustion. Similarly, synthetic fuels derived from P2X can replace traditional fossil fuels, mitigating greenhouse gas emissions. As P2X relies on renewable energy sources, the production and utilization of these energy carriers significantly reduces overall carbon emissions, thus advancing the goal of achieving net-zero carbon emissions.

### What are the opportunities and challenges in Power-to-X?

One of the primary advantages of P2X is its potential to create a symbiotic relationship between renewable energy generation and energy-intensive sectors. However, the path to realizing opportunities comes with its share of challenges. The efficiency of the electrolysis process, a central component of many P2X technologies, remains a concern.




**Opportunities**

- Integration of Renewables: Power-to-X efficiently manages the intermittent nature of renewable energy, enabling the storage of excess energy for later use or transport.
- Emission Reduction: By producing hydrogen and synthetic fuels using renewable sources, Power-to-X substantially curbs carbon emissions, especially in sectors with limited electrification potential.
- Energy Storage: This technology provides a viable energy storage solution, mitigating peak demand or low renewable energy generation periods.
- Holistic Energy Approach: Power-to-X facilitates the convergence of electricity, transportation, and industrial domains, enhancing overall energy system efficiency.
- Export Potential: The exportation of synthetic fuels or hydrogen bolsters energy security and economic growth on the global stage.
- Enhanced Energy Security: Power-to-X diminishes reliance on imported fossil fuels, bolstering energy security for nations.

**Challenges**

- Economic Viability: The technology often demands significant initial investments due to energy-intensive processes and necessary infrastructure.
- Efficiency Concerns: Inherent energy losses during conversion processes may impact the overall efficiency of Power-to-X systems.
- Infrastructure Complexities: Establishing the required infrastructure for hydrogen or synthetic fuel production, storage, and distribution poses intricate technical and financial challenges.
- Resource Constraints: The availability of essential raw materials, such as carbon dioxide and water for synthetic fuel production, could be limited in specific geographical regions.
- Regulatory Hurdles: Insufficient policy and regulatory frameworks, including the absence of carbon pricing mechanisms, might hinder the widespread adoption and scaling of Power-to-X.
- Technological Maturation: Certain conversion processes, like large-scale electrochemical synthesis, are in nascent stages and necessitate further research and refinement.
- Competition with Alternatives: Other clean energy technologies, notably battery storage, may compete for investments and attention, impacting Power-to-X's growth trajectory.

### The present demand scenario of Power-to-X technology

Demand for P2X technologies is steadily rising as both governments and corporations strive to reduce their carbon footprints and transition to lower-emission energy sources.

The adoption of renewable energy, particularly solar and wind power, creates situations where excess energy is produced during peak periods. This surplus energy can be harnessed through P2X technologies, providing a viable solution for storing and utilizing this energy at a later time.

Industries that are difficult to electrify directly, such as steel manufacturing, aviation, and heavy transportation, see P2X as a critical avenue for decarbonization. Governments and policymakers are recognizing the potential of P2X and are crafting supportive policies, incentives, and funding mechanisms to encourage research, development, and deployment of these technologies.

### Which countries and are leading the Power-to-X revolution?

Several countries have emerged as leaders in incorporating and advancing P2X technologies. Germany, known for its Energiewende (energy transition) policy, is at the forefront of P2X innovation. The country is investing in research and development to improve P2X efficiency and exploring various applications, including hydrogen production for transportation and industrial use. Denmark, with its substantial wind energy capacity, is leveraging P2X to convert excess wind energy into hydrogen and other energy carriers.

Norway is also making strides in P2X, capitalizing on its hydropower resources to produce clean hydrogen. Japan and South Korea are investing in P2X research to diversify their energy sources and reduce reliance on imported fossil fuels. The Netherlands is actively exploring P2X solutions to address challenges in achieving their emission reduction targets.

India is also not far behind. With India's NDC target of making 50% of its electricity from non-fossil source by 2030, there is huge impetus in the growth of renewable energy mainly in solar and wind. This growth along with various other government policies are attracting major investments in P2X.

### Power-to-X a tangible pathway toward a sustainable energy future

P2X technologies hold the potential to revolutionize the way we produce, store, and consume energy. Simultaneously addressing the challenges of intermittency, storage, and decarbonization, P2X will make a significant contribution to global efforts to combat climate change and achieve net-zero.

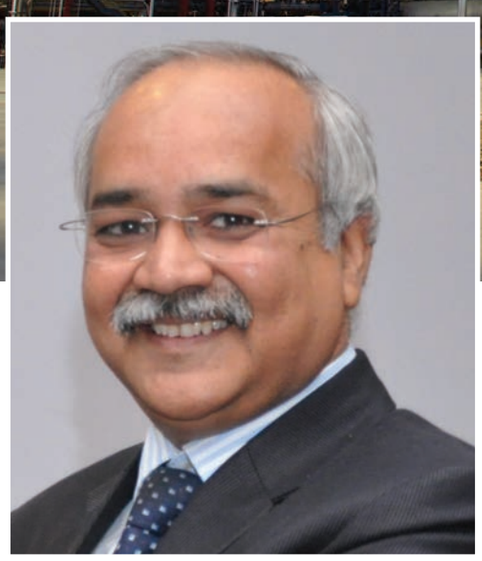
As governments, industries, and researchers collaborate to overcome technical hurdles and optimize P2X processes, the vision of a cleaner and more resilient energy landscape is steadily becoming a reality. P2X is indeed a real hope, an essential tool to ensure a more sustainable and prosperous future for generations to come. ■

## Author

**Mithu Saha**
General Manager - Energy Transition
Worley

INTERVIEW

# Navigating Oil Market Volatility through resilience and innovation : The CEO Perspective



**PRABH DAS**
MD & CEO
HPCL-Mittal Energy Limited (HMEL)

**Prabh Das, MD & CEO, HMEL** has been at the helm of HMEL's growth story since its inception in July, 2007. He was instrumental in implementing this joint venture of HPCL and Mittal Energy Investments. Under his leadership, HMEL set up the greenfield 9 MMTPA Refinery at Bathinda and rapidly grew to an 11.3 MMTPA Refinery with world-class safety practices and robust processes. He spearheaded HMEL's massive over US$ 3 Billion expansion in the field of petrochemicals with the setting up of world-class 1.2 MMTPA cracker unit at Bathinda. Team CEW catches up with him to understand his perspective on navigating the oil market volatility. He shares illuminating perspectives in this exclusive interview addressing the current challenges of oil market. He delves into the transformative petrochemical complex at Guru Gobind Singh Refinery, positioning HMEL as a significant player in the Indian and global markets.

HMEL Petchem HDPE Unit

**What are your thoughts on the recent volatility in the oil market?**

The oil and gas industry isn't new to supply disruptions and price volatility. A confluence of economic, geopolitical, trade, policy, and financial factors have exacerbated the issue of underinvestment and triggered a readjustment in the broader energy market. The situation highlights the need for both short-term adaptability and long-term resilience in the global energy landscape. This volatility also accentuates the significance of diversifying geographies, investing in intelligent tools, and fostering collaborations to ensure stability and sustainable growth in an ever-changing market environment.

**Please share insights into the petrochemical complex in Guru Gobind Singh Refinery, how will this investment position HMEL in Indian and global markets?**

HMEL is responding to reduce the country's dependence on imports and meet the ever-growing domestic demand for Polypropylene (PP) and Polyethylene (PE) and has undertaken a massive over USD 3 Billion expansion in the field of petrochemicals at Bathinda. Our world-class integrated complex now has 2.2 Million MT Petrochemical capacity with a Dual Feed Cracker Unit of 1.2 Million MT/annum of Polyethylene (PE) and 1 Million MT/annum of Polypropylene (PP) capacity to cater to all major application segments. With this investment, we aim to diversify the business by reducing our dependence on fuel-intensive products and establishing HMEL as one of the largest PP/PE producers in the Indian petrochemical market.

**Tell us about the procurement budget & strategy and how have you balanced risk management, supply chain optimization and green purchasing?**

HMEL has Enterprise Risk Management Policy to manage the risk associated with commodity price and protect the margins from the price variations due to market volatility. We have in place enterprise risk register that helps in identifying, scaling, and controlling the organization risk in the changing environment. Concurrently, HMEL uses technology, including integrated LP model for feedstock procurement planning and optimizing software for scheduling, which enables us to take strategic decisions and optimize supply chain. Additionally, we have taken initiatives to continuously purchase solar/wind energy in some of our units. HMEL is working towards linking our facilities to renewable and circular feedstock contributing to the carbon neutrality vision of India.

HMEL Petchem Dual Feed Cracker Unit (DFCU)

**What is the product mix and targeted markets for supplying these petrochemical products?**

HMEL's Guru Gobind Singh Polymer Addition Project consists of downstream polymer units to produce LLDPE (Low Linear Density Polyethylene), HDPE (High Density Polyethylene) and Polypropylene. Products from these plants are the building blocks of multiple key industries ranging from packaging material manufacturing to the healthcare industry for the manufacture of disposable syringes, surgical masks; household furniture; consumer durables, textiles, pipe manufacturing; automobile dashboard manufacturing industries etc. The key markets for these polymer products would be the Northern and Western zones of the country as well as overseas.

**What are the key challenges in the near foreseeable future to be globally competitive and how are you navigating these to drive the growth?**

The volatility in oil prices is likely to continue due to geopolitical tensions and complex supply chains, which could keep the industry under pressure in the short run. It requires the players to innovate, invest in technology adoption and forge strategic partnerships. We at HMEL are at the forefront to embrace the latest technologies such as Artificial Intelligence, Robotics Process Automation and Advanced Analytics, etc., which will make our operations more efficient, safe and reliable. Following the mantra of Improve, Integrate and Innovate, we have deployed cutting-edge technologies like Real Time Optimizer, Advanced Process Control, Supply Chain Automation, IIoT, Virtual Reality, Advance Analytics and many more steps are planned towards the digital transformation of HMEL.

**Talk to us about the plans to get into Green Hydrogen and investment that have been earmarked.**

HMEL is actively exploring strategic opportunities in Green Hydrogen and Green Ammonia, recognizing its potential and supporting the country's sustainable development goals. HMEL has recently forged a powerful partnership with NTPC Green Energy Limited (NGEL) to collaborate in the field of renewable energy and also explore opportunities in the area of green hydrogen & its derivatives (Green Ammonia & Green Methanol). Our Bioethanol Project is in the advanced stage of completion and we have commissioned pilot scale Hydrogen Fuel cell for the supply of power required for charging Forklift Batteries. Moreover, we have implemented multiple schemes to significantly reduce our energy consumption.

**How is HMEL adapting to the changing energy landscape balancing the energy trifecta of sustainability resilience & affordability for energy security?**

Balancing the energy trifecta is an ongoing process that requires adaptation to market dynamics, changing technologies and environmental considerations. HMEL's future strategy is aligned to achieve the optimal balance of energy supply and demand fulfillment encompassing purported investment in renewable energy for a more secure energy mix and fostering sustainability by marking its footprints in the green sector. Secondly, with our diversification into petrochemicals, HMEL is bolstering resilience by mitigating high dependence on fuel products. And lastly, HMEL continues to leverage advanced technologies and innovation which can lead to breakthroughs that enhance the country's energy efficiency, resilience, and sustainability. ■

# Energy Efficient Refining Technologies

Refinery sector is regarded as the leading energy consuming industry that shares 33.1% of the total energy consumption in industrial sectors in India. Shyam Choudhary emphasizes about the significant challenges for the energy efficiency of refineries and common methods used in refineries for energy optimization.

Energy is one of the key resources for a country's economic growth and development. In a world that is increasingly becoming resource constrained, the emerging challenge for a country like India is to strike a balance between trying to catapult the country to the next level of economic growth and at the same time negate the challenges arising out of increased energy uses.

India is the third-largest energy consumer in the world after China and the United States and the most populous country, with 1.4 billion people. India's energy needs continue to grow as a result of population growth and modernization and is expected to double by 2040.

The country's energy consumption is projected to reach 1,500 million tonnes of oil equivalent (MTOE) by 2040, up from 849 MTOE in 2019. This rapid growth has further increased the importance of efficient use of energy. Due to this, the energy intensity of various industries has come under special focus and oil refineries are one of them.

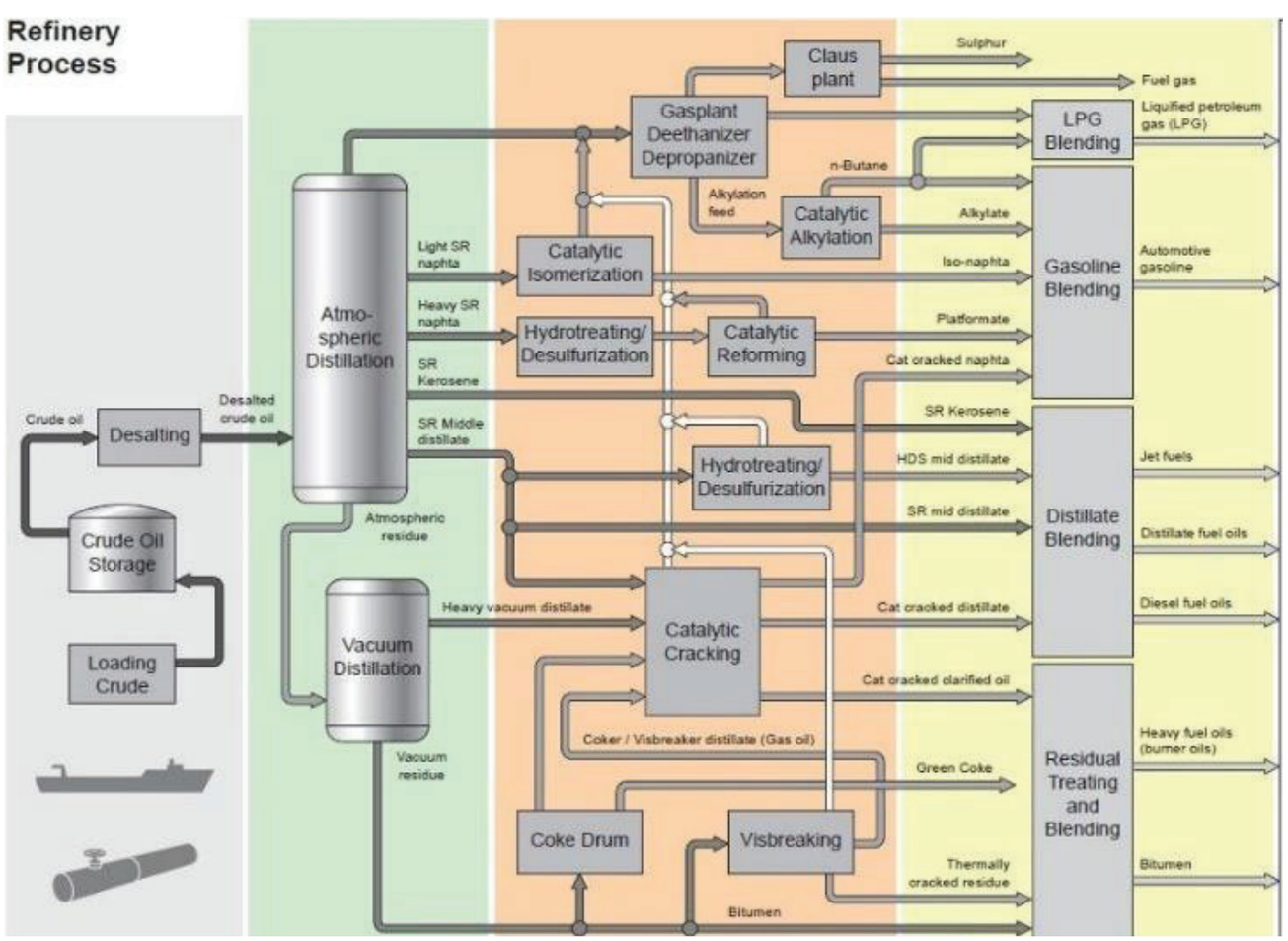



Fig.1: Typical Refinery Configuration

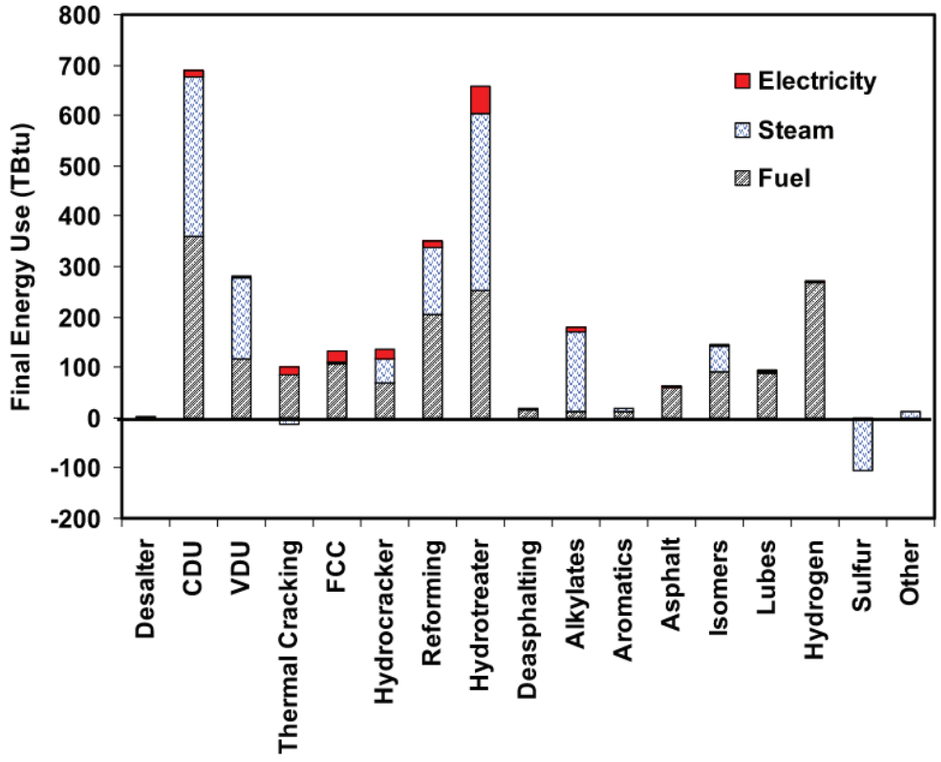



Fig.2: Estimated Energy Use by Refining Process

Stringent environmental regulations are also prompting an additional incentive to save energy and adopt energy efficient practices to reduce carbon footprint.

## Today's Refineries

Modern refineries are highly complex and integrated, separating and transforming crude oil into a wide variety of products, e.g. transportation fuels, residual fuel oils, lubricants, and many other products (see Fig. 1). In the present refineries, hydrocarbon compounds are not only distilled but are also converted and blended into a wider array of products.

Different conversion processes are available using thermal or catalytic processes, e.g. catalytic reformer, where the heavy naphtha, produced in the crude distillation unit, is converted to gasoline, and the Fluid Catalytic Cracker where the distillate of the vacuum distillation unit is converted to gasoline. Newer processes, such as hydrocrackers, are used to produce more light products from the heavy bottom products. Finally, all products may be treated to upgrade product quality (e.g. sulfur removal using a hydrotreater). Side processes that are used to condition inputs, produce hydrogen or by-products include crude conditioning (e.g. desalting), hydrogen production, power and steam production, and asphalt production.

## Energy Use in Refinery

Today's refineries process various types of crude oil from different sources. Over the past years, there has been an overall trend towards more heavy crudes and higher sulfur content. The changing nature of crude oil inputs and the increasing demand for low-sulfur fuels present significant challenges for the energy efficiency of refineries. To address these challenges, refineries need to adopt a range of strategies to optimize their operations and reduce energy consumption. Furthermore, operational factors like capacity utilization, maintenance practices, as well as age of the equipment also affect energy use in a refinery from year to year.

Major energy consumer processes in a typical refinery are crude distillation, hydrotreating, reforming, vacuum distillation, and catalytic cracking. Hydrocracking and hydrogen production are growing energy consumers in the refining industry.

Figure 2 depicts an energy balance for refineries that is based on publicly available data on process throughput (EIA, 2002), specific energy consumption (Gary and Handwerk, 1994; U.S. DOE-OIT, 1998; U.S. DOE-OIT, 2002) and energy consumption data (EIA, 2001; EIA, 2002). The energy balance is an estimate based on publicly available data and is based on many assumptions on process efficiencies and throughputs.

In 1960s, energy conservation was a relatively simple economic issue. Refinery energy-efficiency was decided primarily in the design phase, and by optimizing between energy and investment costs of heat and power recovery equipment. However, refinery design guidelines changed as fuel prices increased and more energy-efficient designs replaced older, less efficient designs.

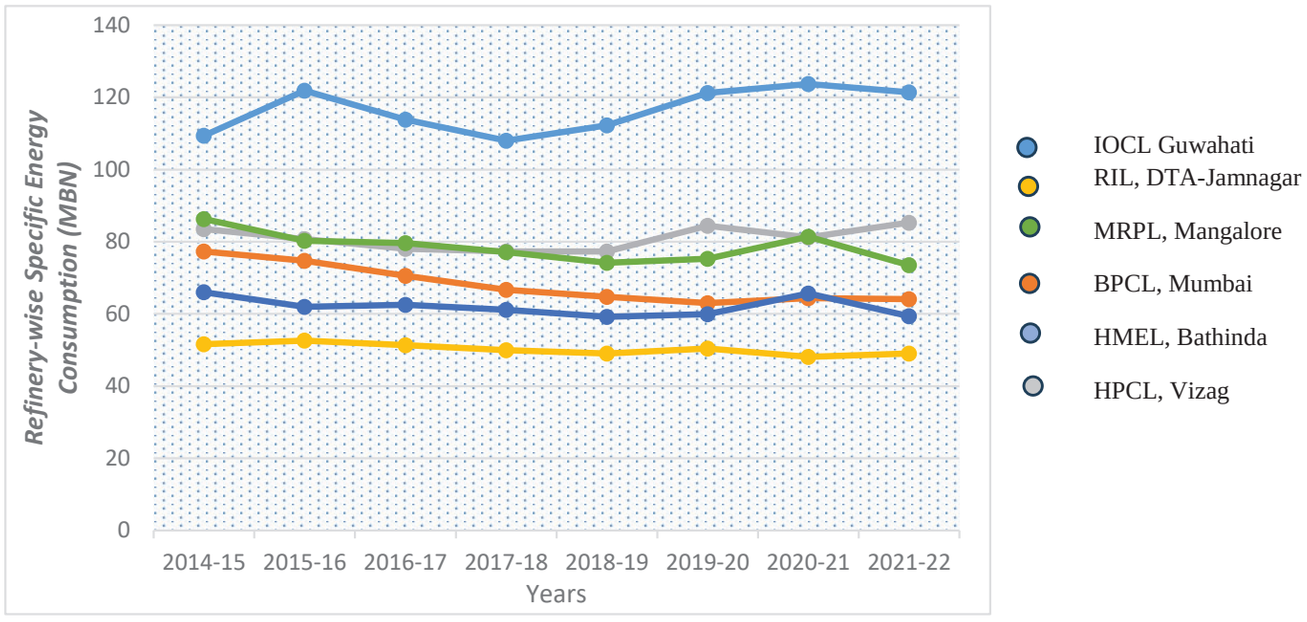



Fig.3: Specific Energy Consumption of Indian Refineries

New technologies that matured in the 1980s, such as the industrial gas turbine and pinch technology, made significant impacts but for a relatively short period.

For example, preheat trains were designed for an approach temperature of about 60°C in the1960s. This optimum then decreased to about 20°C in the 1970s and early 1980s. This decrease offered large scope for improvement. Today, the optimum approach is likely to be 35–40°C. Thus, revamping a preheat train in the 1980s allowed three times more energy savings than in the 1990s.

## Energy Efficiency

The refining industry can be classified as energy inefficient. Therefore, the energy efficiency of an average refinery is relatively low, and the scope for improvement is high.

Refinery energy performance can be assessed in terms of the 'best technology' (BT) index of the site. This index is the ratio of the refinery total energy consumption (including fuels, FCC coke, and power import) to the sum of BT energy consumption allowances (standards) for each process unit and for the off sites (mostly followed for European & US refineries).

The BT standards have been developed by fundamental analysis and design studies on individual process units. They take into consideration the key process parameters affecting energy consumption, such as actual feed quality, conversion, and fractionation performance.

The industry BT average is about 195 per cent. Thus, it can be said that the refinery industry as a whole is 95 per cent energy inefficient. The reasons usually cited for this condition are as follows:

- Units were designed when the cost of energy was low.
- Phased expansion – new units were built stand-alone and not heat-integrated with older units.
- Utility systems were seldom modified/optimized when onsite expansions were made.
- Capital savings – units were designed for minimum investment cost.
- Refineries rely on power import and have low in-house power generation efficiency.

Together with the refinery's relative energy inefficiency goes an equally inefficient environmental performance. Directionally, reduced energy consumption results in reduced air emissions.

Figure 3 shows the specific energy consumption of Indian refineries in MBN (net energy consumption of in Million British Thermal Unit (MMBTU) per thousand barrels of crude processed).

According to a report by the Ministry of Petroleum and Natural Gas, the average energy consumption per barrel of crude oil processed in Indian refineries is around 6.5 GJ/barrel, which is higher than the global average of around 5.5 GJ/barrel.

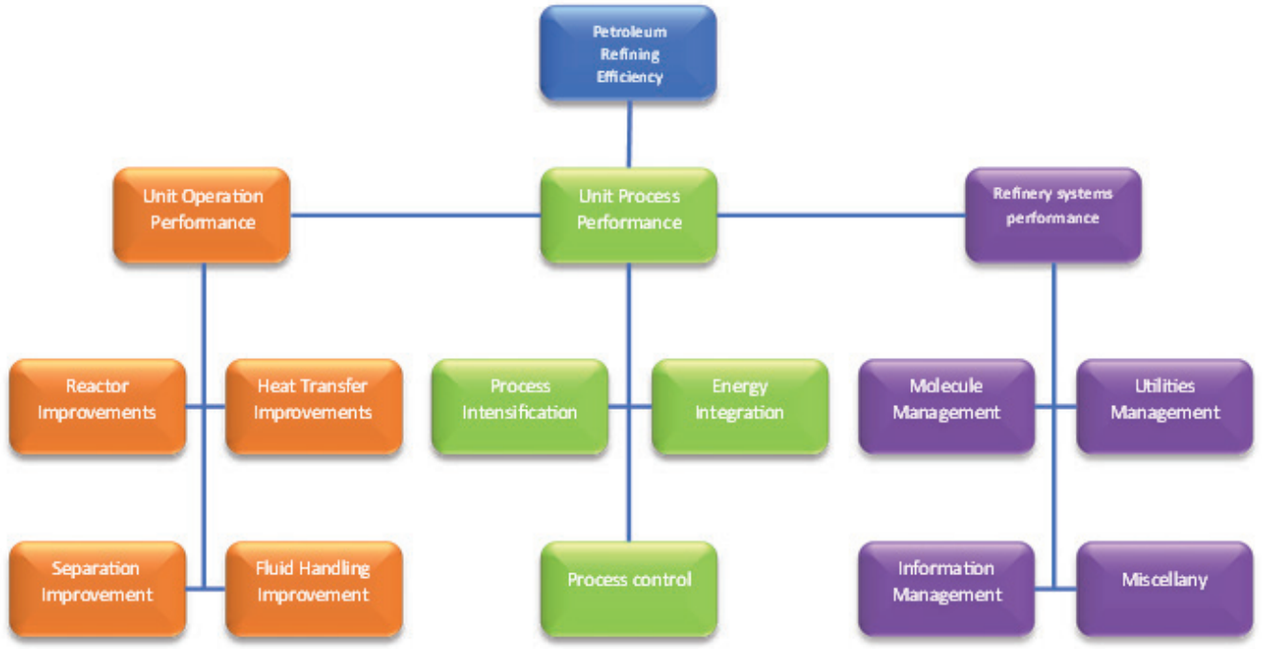



Fig.4: Categories for Efficiency Improvement

## Energy Management Opportunities

A large variety of opportunities exist within refineries to reduce energy consumption while maintaining or enhancing the productivity of the plant.

Major areas for energy efficiency improvement are utilities, fired heaters, process optimization, heat exchangers, motor and motor applications, and other areas. Of these areas, optimization of utilities, heat exchangers and fired heaters offer the most low-investment opportunities.

Implementation of an organization-wide energy management program is one of the most cost-effective ways to bring about energy efficiency improvements. An energy management program creates foundation for improvement and provides guidance for managing energy throughout an organization. In companies without a clear program in place, opportunities for improvement may be unknown or may not be promoted or implemented because of organizational barriers. These barriers may include a lack of communication among plants, a poor understanding of how to create support for an energy efficiency project, limited finances, poor accountability for measures or perceived change from the status quo.

## Categories of Energy Management Opportunities

When efficiency improvement is undertaken for any refinery, all processes and their interactions must be considered. Further, the efficiency of a process is not limited to only in terms of energy, but also in terms of mass and information. Though these three efficiencies are distinct they are also highly correlated. Improved mass efficiency will improve energy efficiency, and the collection and transmission of data enables process optimization and controls to be used to improve both.

Therefore, the efficiency improvement and optimization measures for a refinery can be broadly categorized into 3 categories as described in Figure 4.

## Common Optimization Methodology in Refineries

Pinch technology and Cogeneration are the two most common methods used in refineries for energy optimization.

Pinch Technology: Pinch technology refers to the use of potential synergies that are inherent in any system that consists of multiple components working together. In plants that have multiple heating and cooling demands, the use of process integration techniques may significantly improve efficiency. This methodology involves the linking of hot and cold streams in a process in a thermodynamic optimal way. The pinch approach has been extended to resource conservation in general, whether the resource is capital, time, labor, electrical power, water or a specific chemical species such as hydrogen.

Process integration analysis of existing refineries and processes should be performed regularly, as continuous changes in product mix, mass flows and applied processes can provide new or improved opportunities for energy and resource efficiency.

**Cogeneration:** Combined heat and power (CHP), or cogeneration, is comprised of not one technology but several combined technologies, which, when employed together, generate electricity and heat energy in a single integrated system. In refineries today, the most common components of an efficient cogeneration system have been identified as:

- The industrial gas turbine
- Heat recovery steam generators (HRSG)
- Back pressure and condensing steam turbines.

The gas turbine burns natural gas to produce electricity and expels hot exhaust to the HRSG. The HRSG then recovers the heat from the exhaust to make steam and may even fire additional fuel to enhance steam production. The portion of this steam is utilized in turbine and then let down to the steam header pressure.

Advance Process Control: APC is a powerful tool for improving the energy efficiency of refineries, and it can help to reduce operating costs, improve product quality, and enhance the environmental performance of the refinery.

Advanced process control (APC) is a technology that uses mathematical models and algorithms to optimize the performance of industrial processes. APC systems are designed to monitor and control key process variables in real-time, such as temperature, pressure, flow rate, and chemical composition, to ensure that the process operates at maximum efficiency and quality.

APC can be implemented to improve the energy efficiency of refineries in the following ways:

- Optimizing process parameters
- Reducing energy waste
- Improving heat recovery
- Reducing emissions

## Conclusion

Energy-efficient refining technology is closely linked with carbon emissions because the refining process is energy-intensive and requires a significant amount of fossil fuels to operate. Energy-efficient refining technology can reduce the amount of energy required to refine crude oil into usable products, which in turn reduces the amount of fossil fuels burned to generate that energy. This reduction in fossil fuel consumption leads to a corresponding reduction in carbon emissions, which are a major contributor to climate change.

Most petroleum refineries can economically improve energy efficiency by 10-20% by adopting energy efficient measures. Improved energy efficiency may result in co-benefits that far outweigh the energy cost savings and may lead to an absolute reduction in emissions.

Although technological changes in equipment conserve energy, changes in staff behavior, adopting efficient practices and attitude can also have a great impact; staff should be trained in both skills and in implementing the company's general approach to energy efficiency in their day-to-day practices.

By adopting these changes, the industry will not only reduce their environmental impact but also improve their operational efficiency and competitiveness in the global market ■

## Author

**Shyam kishore Choudhary**
AVP, Head – Process & Technology
Technip Energies

# How data can power OSV sharing to drive down costs and carbon emissions

A delicate challenge is emerging for the offshore industry: demand for offshore supply vessels (OSVs) is growing fast, while at the same time the construction of new assets is slowing down. This equation creates a tight market where making the most of every ship on the water is essential. Vessel sharing offers a promising solution, and the latest generation of digital tools can enable the industry to make it work in practice. **Stanislas Oriot, Senior Marine Consultant,** Opsealog talks about how vessel sharing offers an opportunity to boost OSV utilisation and drive down overall costs.

From an environmental and an economic perspective, it makes little sense to have vessels spending much of their time idle. It leads to unnecessary fuel consumption, which is a waste of money and additional greenhouse gas (GHG) emissions. Yet, this is what often happens when offshore support vessels (OSVs) are on charter.

Vessel sharing, a solution that is already commonplace in the container shipping segment, has occasionally been discussed in offshore circles. In the container industry, companies like CMA CGM, Maersk and others can each place delivery orders on a container vessel, which optimises the use of space and drives down costs. Sharing vessels in the OSV sector would work in a similar way, although it might only be possible for certain types of deck cargo. The transport of many different items can be required, such as containers, hoses, pipes, anchors and more. Partners would have to determine how to organize the collection of empty baskets, and other cargo, as well as the logistics of sharing costs.

In a nutshell, vessel sharing offers an opportunity to boost OSV utilisation and drive down overall costs. However, the practice remains rare in offshore, although there have been some examples of vessel sharing being deployed in

the sector, even over large fleets. For example, a scheme was launched by Peterson with partners Maersk Oil, Petrofac and Dana Petroleum back in 2018. Furthermore, in June 2020 Norwegian oil and gas operators Wintershall DEA Norge and Equinor signed a supply vessel-sharing agreement for the servicing of some of their North Sea assets. The idea was that cargo would be co-ordinated at a common port base, and the vessel would sail a fixed route between platforms. In short, the idea has already been trialled and should be easier to implement now, without requiring as much research and testing.

### Why now?

The concept of OSV vessel sharing is again gaining momentum as a result of the emerging economic and environmental challenges faced by the industry. Today, the offshore industry faces greater pressure to reduce its carbon footprint, combined with the need to adapt to fast-evolving markets and financial contexts. Higher interest rates are slowing down appetite for newbuilds. Consequently, there are fewer vessels available, even as demand continues to increase. With vessel prices going up, day rates have reached record highs and will probably continue to increase in the future. In this context, the potential cost savings and emissions reductions offered by vessel sharing make it an attractive solution.

The current contract model where a charterer hires exclusive use of a vessel for the period of the contract may prove costly enough to prompt a fresh appraisal of the upsides of vessel sharing. The idea of sharing deck space on offshore vessels would help optimize the available space, enable sharing of vessel operational costs and reduce the carbon footprint of the goods delivered to their platforms. The result could be reduced costs and fewer voyages of vessels – therefore minimizing risk, fuel consumption and emissions at sea. In addition, fewer engine hours offers benefits such as reduced maintenance time and costs.

In this context, vessel-sharing agreements have the potential to be a win-win solution for offshore companies and for the environment. As demand for vessels increases, such agreements may become more attractive, but they will require clear frameworks and procedures to manage complexity and mitigate risks, such as safety, logistics, cybersecurity, and flexibility. Crucially, a level of open-mindedness is required from charterers towards different way of delivering operations, at it will be down to their initiative to take advantage of potential efficiency and gains offered by vessel sharing.

### How would this work in practice?

Vessel sharing is not without its complexity. One of the chief concerns is that shared logistics could create delays. Vessel sharing will only proceed with the support of charterers and it is understandable that they want to retain control over the OSV operations, as they have always done to date, as this allows them to better adapt to unpredictable events and reduce the risk of delays. Another potential roadblock is having an appropriate framework for safety or operating procedures, which sometimes vary among charterers.

This is why making vessel sharing work in practice will require solid data and transparent, secure information-sharing. Reliable data collection is essential to help shipowners allocate costs and responsibility for emissions

fairly amongst the different cooperating charterers based on the time spent at each location. Digital solutions that can manage vessel and client information will be needed to allocate costs according to agreed terms and provide the necessary security and transparency.

Web-based platforms, data analytics, and automation solutions can all support this new business model. Vessel sharing has been done in the 1990s, without the data technologies we have at our disposal now – so making vessel sharing a reality in the 2020s should be much easier. Technologies such as blockchain and the Internet of Things (IoT) form the basis of smart systems in other applications, and they could be adapted to the OSV market. They could even enable ship operators to expand their service offerings to include carbon accounting for their charterers' scope 3 emissions. These digital tools would increase transparency, and greater data integration could present further new opportunities for reducing cosLooking ahead

With the need to develop cleaner ways of transporting goods, it is clear that high investments into new fuels and assets will be necessary in the medium and long term. However, this should not preclude the industry from implementing efficiency solutions that can optimise vessel use and reduce fuel consumption today.

Vessel sharing is one of those ways, and it is only one example of the multiple ways in which digitalisation can drive more efficiency in the OSV sector. However, the data structure that would enable such activities is often missing from vessels, so putting a strong digital foundation should be a priority.

By tracking data on factors such as fuel consumption, emissions, and operational patterns, companies gain the advantage of knowing what their starting point is, and of any potential areas for improvement. This is a launch pad for a number of efficiency improvements, on a fleet or individual vessel level, to help the offshore industry ensure that its assets are deployed in a far more efficient and sustainable manner.

A key argument for acting today is ensuring compliance with upcoming regulation, in the EU and elsewhere. In 2024, the EU Emissions Trading System will officially be in place, applying to ships above 5000 GT. In 2025, the system will be revised and potentially be applied to offshore ships above 400 GT and general cargo ships between 400 and 5000 GT transporting cargo for commercial purposes – directly impacting offshore vessels.

As an industry, we can turn challenging economic conditions and the decarbonisation challenge into a performance accelerator that will power new efficiencies, partnerships and ways of working. In other words, we can be both proactive and pragmatic with our decarbonisation journey – and the starting point is data. ■

## Author

**Stanislas Oriot**
Senior Marine Consultant
Opsealog

# How oil and gas firms are transforming their work models to manage market challenges

Digital transformation is the key to thriving in a volatile world.The oil and gas (O&G) sector faces mounting challenges amid a changing world. Market uncertainty and pricing volatility are plaguing the industry, making it difficult for companies to plan and execute accordingly. **Fernanda Martins, Industry Director, Energy and Emerging Markets, AVEVA** talks about digital transformation in oil and gas companies led by the latest advances in cloud, Artificial Intelligence (AI), and Industrial Internet of Things (IIoT).

Ongoing geopolitical events have fractured already-fragile supply chains, while the hangover of the global pandemic has reshaped worker dynamics and reduced the available workforce.

What's more, amid an ever-stricter climate for environmental regulations, companies must stay ahead of mandates and public and industry pressures to meet new ESG targets.

Given the rocky economic climate market of the last few years, many O&G firms have been reluctant to invest in capital upgrades or digital infrastructure to increase efficiencies. But today's wafer-thin margins and high stakes are now acting as a propellant for energy companies to seek out technological solutions for complex challenges.

Across the world, O&G firms are finding success through the digitalization of work. Fresh ways of working with technology, based on common data platforms, advanced analytics and global visibility, are helping companies become more profitable.

According to LNS Research's recent "Industrial Transformation in 2021: Getting Real" report, half of

industrial enterprises report they have embarked on a digital transformation journey, and these programs are yielding very real benefits. LNS found that leaders in digital transformation are 72% more likely to have increased revenues by more than 10% and 57% more likely to have reduced the Cost of Goods Sold (COGS) by more than 10%.

Through the adoption of digital tools, companies are able to leverage their own industrial data and turn that information into innovative insights. This value-added data then enables companies to:

- Speed time from concept to full-capacity production
- Empower the workforce
- Optimize the value chain to create more agile operations
- Enable reliable, efficient, and safe operations
- Meet sustainability and decarbonization objectives.

### Optimized operations through digitization

To accelerate their transformation, forward-looking O&G companies are leveraging digital initiatives powered by the latest advances in cloud, artificial intelligence (AI), big data, digital twin, and industrial Internet of Things (IIoT). Built on open, agnostic industrial software design principles, O&G companies are using these technologies to overcome key challenges, while improving sustainability and the profitability of their businesses.

By digitalizing work, O&G companies can drastically improve collaboration and efficiency, prioritize capital spending, and build more agile operations that can withstand market shifts. Because digital work allows workers to complete tasks from anywhere across different sites and locations, operators can accomplish more than just solving problems. Through digital workflows they can improve overall efficiency, use the remaining time to innovate, and help companies build resilience against workforce disruptions and attract a new generation of workers.

Not only do digital tools enhance enterprise-wide collaboration, but they can also seamlessly unify operations and supply chains, breaking down silos while opening new pathways for information flow. By centralizing operational insights and visualizations, operators can collaborate on the same information at the same time to identify weak spots in the business and work together to improve efficiency and profitability.

Shared data aligned with advanced analytics improves the transfer of institutional knowledge and empowers the workforce. Even when workers are away or retire, new workers can make informed decisions by accessing information in a central digital repository, with contextualized operational data and AI-based guidance.

Digitalization likewise improves sustainability initiatives and regulatory compliance. Software applications can optimize operations, streamline environmental reporting, and maximize energy usage.

### Becoming agile and resilient

With reliable operational data and accurate models, companies can optimize every part of the value chain. From process optimization, to inventory management and supply and demand balance, they can uncover new opportunities that lead to greater profitability.

Agile operations start with quality data and integrations – and that requires a convergence of engineering, operations, and information technology. By creating one single source of truth for real-time operational data and contextualizing that information alongside engineering, performance, and financial data, teams can use AI-powered tools to run real-time comparisons and simulations to find new efficiencies.

### BP: A digital success story

Global energy giant BP's downstream business processes 1.7 million barrels per day in eight refineries around the world. Unfortunately, the company's outdated technology wasn't intuitive and made it difficult to share best practices across locations. Teams were also unable to quickly make decisions to reflect market changes, leading to lost opportunities and benefits. As part of its Digital Innovation Program, BP opted to review its global downstream supply chain management process to enable more agile operations.

BP deployed a series of digital cloud technologies to maximize margin capture, efficiency, and sustainability. One of the solutions was used to optimize the production planning of its downstream business, which allows teams to quickly run complex analyses and analytics using accurate, real-time data. By simplifying and standardizing its supply chain management, BP has fostered better collaboration and planning, which has increased overall agility, significantly reduce crude purchase time and improving the modelling of CO2 emissions.

Overall, BP has significantly improved margins, made better, faster decisions, increased planning and analysis accuracy, and decreased the time it takes to analyze information from hours to minutes.

### Going green with ease

Sustainability and decarbonization are key drivers for the O&G industry. As companies look to reach net-zero targets by 2050, they must increase compliance with energy transition mandates and open up new value chains for carbon and hydrogen.

Reaching these goals and complying with new market demands requires companies to reshape business models, increase investment in ESG programs, and bolster decarbonization initiatives. To succeed, O&G companies need to modernize facilities and increase visibility across the value chain.

Access to reliable data, optimization models in the cloud and enhanced KPI visualization gives companies the operational intelligence they need to boost the value chain, reduce emissions, and innovate to reach energy targets.

### Thriving in a new age

Through digital initiatives powered by the latest technology enablers, O&G companies can build industrial information infrastructure and upgrade engineering and operations applications to accelerate value creation. They can then visualize and share industrial data within their teams and value chain partners. By undertaking these initiatives, O&G firms of the future can streamline engineering cycles, achieve operational excellence, and empower their workforces to drive the circular economy and ensure profitable, sustainable operations. ■

## Author

**Fernanda Martins**
Industry Director
Energy and Emerging Markets, AVEVA

GUEST COLUMN

# Applications for Artificial Intelligence in EPC Industry

**RUPCHAND LOHANA**
Head of Central Digital SCM,
L&T Energy – Hydrocarbon

**Rupchand Lohana** emphasizes about the Digitalization playing important role in Engineering, Procurement & Construction (EPC) sector. He gives a brief insight, about how Artificial Intelligence tools could boost its growth.

ChatGPT was launched on 30th November 2022. By January 2023, it became the fastest-growing consumer software application in history, gaining over 100 million users in less than 2 months. Artificial Intelligence (AI) went from being a looming threat to an immediate disruptor across sectors. The sheer capacity of a Large Language Model (LLM) such as ChatGPT or any other variant, to ingest and process significant amount of data has bolstered new use cases for analytical as well as generative purposes across data formats viz. text, voice, image, and video. A case study from Gartner highlights the growth of generative AI from 2010 to 2022.

Today, LLMs can imitate human like responses with much faster speed and a wider knowledge base, but they still require supervision and review. Also, it does not get irritated with more corrections, iterations, and repetitions. LLMs trained on publicly available data are now readily available using websites such as ChatGPT and BARD. AImultiple has listed many generative tools that provide output in the form of Visuals (Image, Video and Designs), Audio (Voice, Music), Text, and Code in multiple programming languages. These use cases are taking off, being perfected at a rapid pace, and have already started threatening many jobs.

Use cases based on internal or private data (which is confidential, better structured, relevant, and important) are more complex. Tools such as Microsoft Copilot can create a quick presentation or draft email, based on existing email trails, prompts or other available data. However, these are just pre-cursors to the wave of new applications which are being developed and could improve productivity significantly. All major software

Figure 1: AI image generated from 'https://www.fotor.com/images/create' with prompt 'Engineer reviewing drawing in front of refinery.'

providers, including Microsoft, Amazon, Google, etc. are now providing tools and platforms capable of using generative AI based use cases, which could ingest additional unstructured data and churn out relevant output. Even product focused companies like SAP, are now providing tools for quick code generation to reduce development cycles.

Traditionally, the EPC industry lags other industries in terms of digitalization levels. This is partially due to unstructured data and voluminous documents. However, generative AI tools could significantly change the same and help EPC companies accelerate this journey. Some of the potential use cases for EPC industry are listed below:

### General Communication

- Drafting appropriate responses with improved reference, based on trailing correspondence.
- Drafting legal correspondence to letters based on contract clauses and annexures.

### Knowledge Management

- **C**reating project closeout reports based on available documentation.
- Providing fairly accurate search results based on previous project data or standard operating procedures, even for complicated inputs in natural language.
- Responding to open ended questions and providing situational guidance to aid decision making.

### Proposals

- Summarising scope of work from voluminous bid documents.
- Creating high level parametric comparison of complex bid packages.
- Identifying cost elements
- Identifying project risks
- Extracting list of equipments
- Quick scheduling for project completion.

### Engineering

- Creating a new 3D model based on similar packages in past projects.
- Drawing preparation based on unstructured inputs.
- Intelligent Robotic Process Automations (RPA) can

replace rule based or visual object-based RPAs. AI may handle these intuitively to handle variations in the process.

- Design optimisation e.g., designing structure with least weight, reduced material waste.

### Procurement

- Creating technical bid evaluations quickly based on offer documents.
- Negotiating with the suppliers based on existing data for standard/ off-the-shelf items.
- Identifying patterns and clusters in spend data.
- Identifying governance lapses and aiding in fraud detection.
- Raising queries for identified deficiency during invoice processing.

### Fabrication / Construction

- Creating of fabrication drawings based on 3D models.
- Video analytics for identifying number of people in given area, stationary or moving or in certain position. See figure 2 below
- Autonomous Welding robots with limited human inputs
- Autonomous hydra cranes / warehousing robots for material handling
- Facial recognition for automated attendance and productivity measurement.
- Testing knowledge levels of workmen. Providing interactive platform for their training.

### Project Management

- Creating new project plan based on previous plans. Currently, most plans are created by copying old plan and intelligently modifying them takes lots of time. AI can do the same with minimal efforts.
- Creating of weekly project reports based on significant data inputs across systems and reading information received in emails.
- Enable near real time dashboards.
- Identifying potential risks in real time and trigger timely notifications.
- Provide data promptly for decision making. Reduce number of search results to few most relevant.

**Reducing Concurrency:** Lots of rework happens in EPC primarily due to concurrent Engineering, Procurement and Construction phases. Use of AI could compress the schedule for each phase in project (E, P, C) and reduce concurrency / overlap. This will result in significant reduction in rework and corresponding increase in productivity.

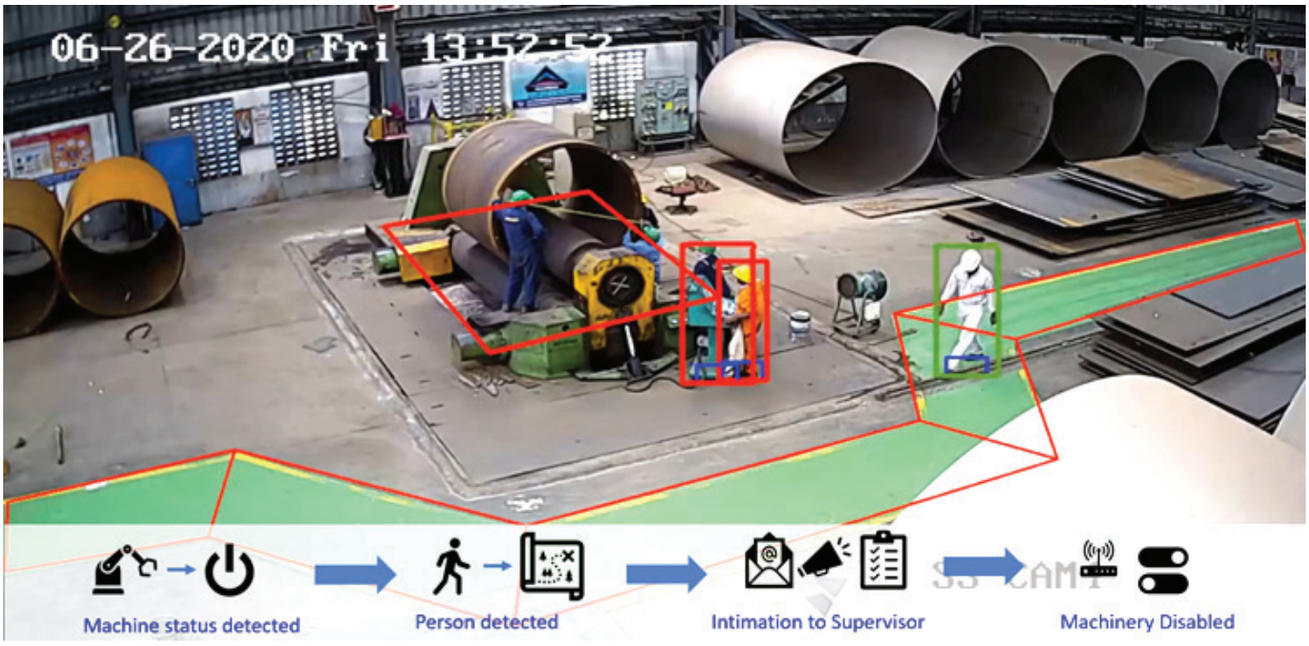



Figure 2: Identifying people not on the safe path and / or not wearing Personal Protective Equipment using AI based Video Analytics in real time.

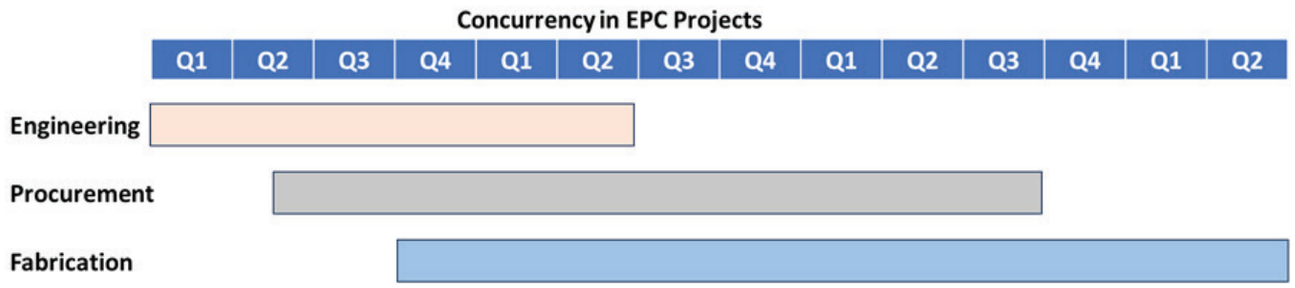



**Figure 3: Csoncurrency in EPC Projects**

Developments such as Amazon warehousing robots or Tesla's Full Self Driving (FSD) cars are recent examples of AI integration with physical assets. The end user needs limited instructional programming capability to operate them. Soon, AI will be able to operate equipment such as robotic welding machines, cranes etc., with limited supervision. Such use cases may give boost to Construction Productivity in projects, which has not improved significantly in last 2 decades.

More such use cases are emerging at an exponential pace. However, it is important to understand the risks associated with use of Generative AI including lack of transparency, accuracy, bias, intellectual property infringement, cybersecurity lapse and frauds. Also, sometimes you may unconsciously share confidential data with generative AI models that may get integrated in the public training dataset.

Productivity improvements may also mean less new jobs, and more work being done with a smaller number of people. However, we cannot wish away progress and turn a blind eye to technology, which will find its way irrespective of artificial barriers or fear mongering. It is important to embrace the situation and adapt new working styles. Few steps that can be taken are:

### Skill Development

Workforce should be made aware of these tools and trained for its use. Further, these technologies can be used for more effective and personalised training.

### Data Infrastructure

Trained AI models can segregate useful data, like wheat from the chaff and overcome the 'Garbage In, Garbage Out' (GIGO) principle. But even with such advancements, data needs to be relevant. Irrelevant data could mean inaccurate results which would be difficult to validate, believe or interpret. Thus, AI models need to be validated with an expert review, especially for critical situations.

### Integration with Existing Processes

It is important to identify correct use cases (or bottlenecks) within existing setup and use AI to resolve them. IT industry is evolving to support quick deployment of generative AI tools within existing setups.

### Change Management

Changing anything needs effort and it is important to focus energies on the correct use cases. Extensive testing and validation may be required as part of pilot projects.

Thanks to improved productivity, AI will drive growth due in near future. Contractors will benefit from implementation of such technologies and pass on some of these benefits to project owners. Hence, owners should nudge EPC contractors to use these technologies to improve the industry.

We are at the inflection point with advent of Generative AI. As AI exhibits more humane traits, it will quickly assimilate into our work. Generative AI swill not just transform EPC, but every sector soon. So, keep your senses sharp and learn to navigate the future with this revolutionary technology. ■

# Oil Gas & Power

**Quarterly Magazine for Comprehensive Information @ Emerging Energy Ecosystems**

## UPCOMING ISSUES

**December 2023**
**Asset Integrity**

**March 2024**
**Sustainability**


**Jasubhai Media Pvt Ltd**

Taj Building, 3rd Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.
**Tel:** +91-22-4037 3636, **Email:** sales@jasubhai.com

www.jasubhaimedia.com

Supported by

Chemtech FOUNDATION
Inspiring Intelligence > Igniting Innovation

World Meet of the CHEMICALS, PETROCHEMICALS, BIOPHARMA & PROCESS Industry in India

Ministry of Chemicals & Fertilizers
Department of Chemicals and Petrochemicals, Government of India
Department of Biotechnology
Ministry of Science and Technology
Government of India
सत्यमेव जयते

DECHEMA Society for Chemical Engineering and Biotechnology e. V.
VDMA Process Plant and Equipment

# ChemTECH WORLD EXPO 2024

## 31st International Exhibition & Conferences

**4-7 March 2024**

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

50 CHEMTECH FOUNDATION 1974-2024
Inspiring Intelligence...
..Igniting Innovation

***Join us for 50th Years Celebration***

## LEADERSHIP FOR CHEMTECH 2024

**Maulik Jasubhai**
Chairman & Chief Executive
Jasubhai Group & Chemtech Foundation
Honorary Consul General of Austria in Mumbai

Patron & Brand Ambassador
ChemTECH World Expo 2024
**Shri Suresh Prabhu**
Former Member of Parliament
Government of India

Jury ChairmanChemtech Leadership & Excellence Awards 2024
**Dr. R A Mashelkar**
Scientist, Former Director General, Council of Scientific and Industrial Research (CSIR)

Chairman
CAB BioPharma World Expo 2024
**Dr Rajesh Gokhale**
Secretary, DBT, Ministry of Science & Technology, Govt. of India

Chairman,
Specialty Chemicals World Expo 2024
**Mr. Nadir Godrej**
Chairman & Managing Director
Godrej Industries Ltd

Chairman
EPC World Expo 2024
**Mr. B Narayan**
Group President Projects
& Procurement, Reliance Industries Ltd

Co-Chairman
EPC World Expo 2024
**Mr. Subramanian Sarma**
Whole time Director & Sr. EVP Energy
Larsen & Toubro Limited

Chairperson, Refining & Petrochemicals World Expo 2024
**Ms. Sukla Mistry**
Director (Refineries)
Indian Oil Corporation Ltd

Co-Chairman, Refining & Petrochemicals World Expo 2024
**Mr. Sanjay Khanna**
Director (Refineries)
Bharat Petroleum Corporation ltd

Chairman, CAB Chloralkali World Expo 2024
**Mr. Jayant Dhobley**
Business Head & CEO, Global Chemicals, Fashion Yarn & Insulators
Aditya Birla Group

Chairman,
WaterEX World Expo 2024
**Mr. P Raghavendra Rao, IAS**
Chairman, Haryana State Pollution Control Board, Ex Secretary (Chemicals & Petrochemicals)

Chairman, Industry Automation & Control and Pumps Valves & Fittings World Expo 2024
**Mr. Rajeev Gupta**
Director Projects, Engineers India Ltd

Convener
Specialty Chemicals World Expo 2024
**Dr. Raman Ramachandran**
Director & Dean
K J Somaiya Institute of Management

Key Member of Board
Specialty Chemicals World Expo 2024
**Mr. Rajendra Gogri**
Chairman & Managing Director
Aarti Industries Ltd

Chairman, SCALE 2024
**Mr. Mirik Gogri**
Head – Corporate Strategy
Aarti Industries Ltd & Managing Partner
Spectrum Impact

Concurrent Events

EPC World · Specialty Chemical World Expo & Conference 2024 · Chlor-Alkali World Expo & Conference 2024 · Bio Pharma World Expo 2024 · LAB ANALYTIX World Expo · Refining & Petrochemicals 2024 · WaterEX WORLD EXPO 2024 · Industry AUTOMATION & Control 2024 · PVF Process Valves & Fittings WORLD EXPO 2024 · BOILER World Expo 2024 · Surface Engineering Coating & Corrosion World Expo 2024 · Student Outreach Program 2024 Develop Future Leaders

**More than 400 Exhibitors already confirmed**

## EXHIBITOR GROUPS

- Chemical & Pharma Processing
- Process Plants & Equipment
- Thermal & Mechanical Processing
- Engineering Procurement & Construction
- Technology Licensors
- Project Management Consultants
- Refining
- Chemicals & Petrochemicals
- Specialty Chemicals
- Chloroalkali
- Fertilizers
- Water & Waste Management
- Environment Technologies & Services
- Digital Services
- Industrial Automation
- Instrumentation & Process Automation
- Electrical Equipment
- Research & Development
- Biotechnology
- Green Chemistry
- Banking Finance & Insurance
- Lab & Analytical Instruments

**PHARMA & BIOPHARMA**

- Ingredients
- Bulk drugs
- R&D
- Warehousing
- Cold chain
- Packaging
- Contract Research & Manufacturing

**CLEAN ENERGY**

- Hydrogen
- Biofuels
- Methanol
- Carbon Capture Utilization & Storage
- Renewables – Solar Wind & Hydro

**LOGISTICS**

- Logistics Services
- Containers
- Supply Chain Management
- Packaging
- Material Handling
- Storage & Warehousing
- Cold Chain Management

**CORROSION CONTROL**

- Industrial Coatings
- Corrosion Control Technologies & Services
- Surface Engineering Solutions
- New metallurgies
- Inspection & Monitoring Technologies

Co Operation Partners

Gold Partners: LARSEN & TOUBRO · BURNS McDONNELL

Bronze Partner: EVONIK Leading Beyond Chemistry · CHEMIPLANT ENGINEERING ENCOMPASSING TECHNOLOGY · aarvi

Organised by:

Jasubhai MEDIA

## Jasubhai Media Pvt Ltd

Taj Building, 3rd 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 - 09891469629
Hyderabad / Pune - 09822209183 | Vadodara - 09820544904

**sales@jasubhai.com** **www.chemtech-online.com**

Chemtech FOUNDATION
Inspiring Intelligence › Igniting Innovation

International Integrated **ENERGY** Exhibition & Conferences

# Oil Gas & Power

World Expo 2025

50 CHEMTECH FOUNDATION 1974-2024
Inspiring Intelligence...
..Igniting Innovation

## 5-7 March 2025

**Venue:** Hall 4, Bombay Exhibition Center, Goregaon (East), Mumbai, India

**Chairman**
**Central Advisory Board**
**Oil & Gas World Expo 2025**

**Mr. Pankaj Kumar**
Director (Production)
ONGC Ltd

Concurrent Events

Oil&GAS World Expo 2025 | POWER + COAL World Expo 2025 | GAS WORLDTECH Expo 2025
Refining & Petro CHEMICALS 2025 | INLAND WATERWAYS & PORTS World Expo 2025 | MARITIME & LOGISTICS | SURFACE ENGINEERING & Corrosion Control World Expo 2025

## EXHIBITOR GROUPS

### OIL & GAS
- Exploration & Production
- Oil Field Services
- Geographical and Seismic Surveys
- Drilling
- Sub Sea
- Transportation Storage & Infrastructure

### NATURAL GAS & LNG
- Natural Gas Marketing
- City Gas Distribution
- Transportation & Storage Infrastructure

### REFINING
- Oil Refining
- Marketing
- Petrochemicals Manufacturing
- Technology Licensors

### POWER
- Power Generation
- Technology Licensors
- Power Transmission & Distribution
- Infrastructure

### CLEAN ENERGY
- Renewables – Solar Wind & Hydro
- Hydrogen
- Biofuels
- Methanol
- Nuclear

### ENGINEERING SERVICES
- EPC services
- Project Management Consultants
- Engineering Services
- Construction

### SHIPPING MARINE & PORTS
- Shipping Services
- Ports
- Inland water ways
- Transportation Warehousing
- Supply Chain Management
- Material Handling & Supply Chain Management
- Logistics Services

### CORROSION CONTROL
- Surface Engineering
- New metallurgies
- Industrial Coatings
- Corrosion Control Technologies & Services

### PROCESS PLANTS & PLANT EQUIPMENT
- Distillation Columns
- Reactors
- Heat Exchangers, Cooling Towers & Boilers
- Storage Tanks
- Compressors , Pumps & Valves
- Plant instrumentation & automation
- IT Infrastructure & Digital Technologies

## FACTS AND FIGURES 2023

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **3** DAY TRADESHOW | **201** EXHIBITORS & PARTNERS | **8897** VISITORS FROM 28 COUNTRIES | **192** VIP GUESTS | **5** CONFERENCES | **853** DELEGATES | **147** SPEAKERS | **670** ENGINEERING UNDERGRADS FROM 23 C OLLEGES ACROSS INDIA |

Organised by:

Jasubhai MEDIA

## Jasubhai Media Pvt Ltd

Taj Building, 3rd 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 - 09891469629 | Hyderabad / Pune - 09822209183 | Vadodara - 09820544904

**sales@jasubhai.com** **www.chemtech-online.com**