March 2023

International Integrated **Energy** Special Issue

Oil Gas & Power

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Oil Gas & Power
World Expo 2025
March 2025, Mumbai, India

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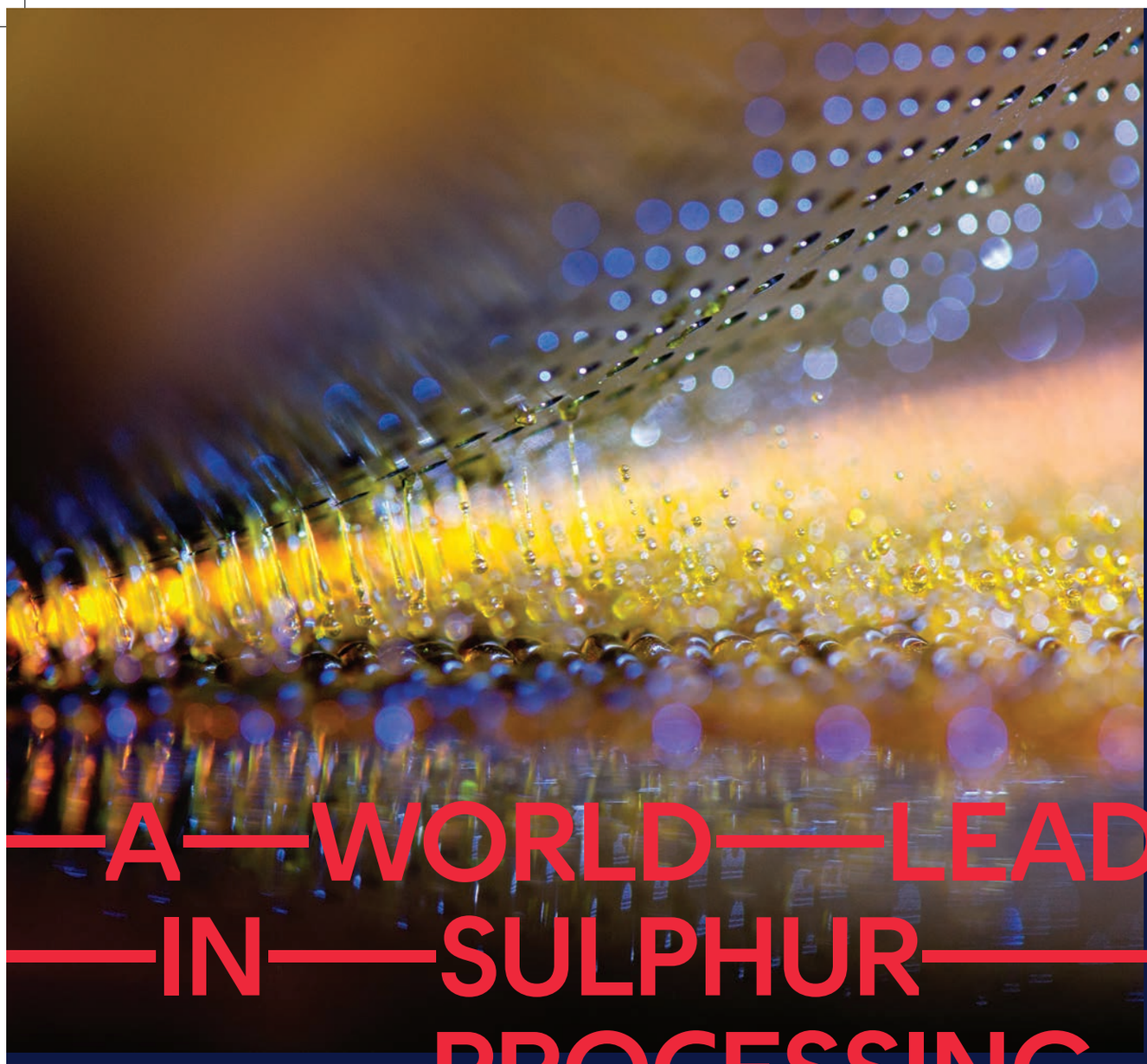

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Alleima inaugurates a new manufacturing facility in Mehsana Mill in Gujarat, India

Alleima, a global manufacturer and supplier of advanced stainless steels, special alloys, and heating systems, will inaugurate its new Hydraulic and Instrumentation tubing factory on March 15, 2023, at its Mehsana Mill in Gujarat, western India. The investment that Alleima made in 2021 has now concluded and is part of a larger growth initiative that Alleima started in 2017. The new factory will meet the increasing demand for locally manufactured products in India.

In 1983, Alleima established its first operation in Pune, India. Since then, the company's activities in the country have expanded. Today, India is one of Alleima's key geographical areas, and the Mehsana manufacturing facility has since grown in importance. Having been successively expanded and modernized, the factory has increased production and availability of high quality seamless stainless steel and high alloy tubes to strengthen service in the region. Now, the inauguration of the important investment will finally take place.

"As part of our strategy to invest capacity and capability in growth markets, the new Hydraulic and Instrumentation tubing manufacturing facility will enable us to serve our customers locally with premium products in India. The investment aims to capture growth opportunities in the Chemical and Petrochemical segment. There is also a

Göran Björkman, President & CEO, Alleima.

change towards increased natural gas in the energy mix and a shift towards alternative clean fuels, which present further growth opportunities. The Mehsana Mill is an important facility in our journey towards strengthening our footprint in Asia" says Göran Björkman, President and CEO at Alleima.

The first phase of this growth initiative first started in 2017. It was completed in 2020 when Alleima added a new cold finishing tube manufacturing line mainly for heat exchanger tubing and other demanding industrial applications. This time, the investment has been divided into two parts, a new Hydraulic and Instrumentation tubing factory, and a Heat Exchanger (HX) cold finish Tube Capacity that will be fully completed and operational in 2023.

"For the past few years, we have been focusing on boosting capacity, adding new products, and constantly improving our capabilities to meet the highest global quality standards and customer specifications. The new factory will expand the Hydraulic and Instrumentation Tube capacity to meet the growing market for infrastructure around natural gas. This move will also enable the transition towards cleaner alternative fuels and meet the increased demand from growth in the Chemical and Petrochemical segment in India," says Sharath Satish, President, Business Unit Tube APAC, Alleima, and continues.

Sharath Satish, President, Business Unit Tube APAC, Alleima

"We look forward to ramping up our production to cater to the increasing demand for locally manufactured products in India while aligning with the Government of India's "Make in India" and "Atma Nirbhar Bharat" program for Self-Reliance. Through this investment, we also look forward to enabling further export and swifter delivery times to customers across the region." ■

Website: https://www.alleima.com/en/

Sanicro 35: Super Austenitic Steel Alloy for Corrosive Environments

Sharath Satish
President
Business Unit Tube APAC
Alleima

What are the latest products Alleima has showcased at Oil Gas & Power World Expo 2023?

We are proudly showcasing our recent innovation in materials technology- Sanicro 35. It is a versatile grade for service in a range of corrosive environments. Sanicro 35 is a cost-effective innovation that bridges many material property gaps between stainless steel and costly nickel alloys. The alloy won the materials design category in the Materials Performance Corrosion Innovation of the Year Awards in 2021 hosted by AMPP.

Tell us about the applications of these new technologies & their relevance for buyers.

Sanicro 35 was designed for service in aggressive corrosive environments such as hydrochloric acid, nitric acid, acetic acid, sodium hydroxide, hydrogen sulphide and seawater. It offers the desirable corrosion resistance of high nickel grades as demonstrated by its extreme critical pitting and crevice temperatures combined with excellent mechanical properties weldability. Sanicro 35 has very good mechanical properties and is easily weldable without the need of pre- or post- weld heat treatments. These attributes mean that this versatile alloy can be used in Oil & Gas, Chemical and Petrochemical applications. Sanicro 35 is serving the need of our customers where the conditions are too challenging for stainless steels and Ni alloys are not very cost effective. The value proposition of this alloy has resonated with many of our customers, and we have installed it in applications such as CDU overhead condensers, Reactor Effluent Air Coolers, Sea water coolers.

How is Alleima evolving in Materials Technology and how are you positioning yourselves in India and in the global markets?

Alleima has a rich 160-year-old heritage. We have thrived and evolved because of our culture of innovation in materials technology. Our success in staying ahead lies in partnering with our customers to solve their problems. Our extensive industry knowledge in combination with materials and process competence helps us to advance our customers' processes to be more efficient. We will continue to support our customers in their journey of energy transition, energy efficiency and help raise their productivity.

Walk us through the future plans of your company.

We are committed to be at the forefront of sustainability and to advance industries through sustainable offerings and operations. We will continue to expand our portfolio of advanced stainless steels and special alloys with localized manufacturing footprint closer to the customers. ■

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World Expo 2025

March 2025, Mumbai, India

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Oil&GAS World Expo 2023

Oil & Gas E&P: Challenges & Opportunities

GAS WORLDTECH Expo 2023

Gas Based Economy For Growth & Sustainability

(L-R) Desikan Sundararajan, Managing Director & Country Manager – India, Equinor, Rajarshi Gupta, Managing Director, ONGC Videsh Limited (OVL), Pankaj Kumar, Director (Production), ONGC Ltd, Maulik Jasubhai, Chairman & Chief Executive, Jasubhai Group, Pankaj Kumar Goswami, Director (Operations), Oil India Limited and Parthasarathi Chatterjee, Head of Offshore Vertical, L&T Energy (Hydrocarbon) unveiling Exhibitor's directory during Inaugural session of Oil & Gas World Expo 2023

Pankaj Kumar
Director (Production), ONGC Ltd
Chairman CAB
Oil & Gas World Expo 2023

ओएनजीसी ONGC

"Since long, the world has been discussing about the future of fossil fuels in the backdrop of climatic concerns. COP26 outlined many concerns and expectations from this industry and just concluded COP27 has emphasized the concerns further. Discussions are underway what progressive approach Energy Company is adopting towards greener energy. The conference Oil & Gas World Expo 2023 holds significance in this backdrop discussing the Opportunities and Challenges that lie ahead for this industry. In its 50th year, Chemtech Foundation has been seemingly involved in inspiring the intelligence and igniting the innovation. I congratulate Chemtech Foundation for steering forward the cause of Oil & Gas industry and providing a forum to put our minds together to devise doable solutions for the industry."

M V Iyer
Director (Marketing), GAIL (India) Ltd
Chairman CAB
Gas World Tech Expo 2023

गेल GAIL
GAIL (India) Limited

"I am pleased to note, Chemtech is organising the integrated energy industry meet and focused Gas World Tech conference at very right time to engage the industry patrons for deliberations to create the roadmap to realize the Energy Vision."

(L-R) YPS Suri, ED, Chemtech Foundation; Subramanian Sarma, Whole time Director & Sr. EVP (Energy), L & T; Suresh Prabhu, former Union Minister, Government of India ; Dr A K Balyan; Advisor & Independent Director, Dipon Group; & Hemant Shetty, CEO Jasubhai Media Pvt Ltd & Chemtech Foundation, interacting with bright & young engineers during Student Outreach Program 2023

Suresh Prabhu
Former Union Minister
Government of India

"The Oil Gas & Power Conference arranged by Chemtech is very relevant to the happenings in the energy sector which are very critical for economy, society & our survival. And at this Student Outreach Program I am very delighted to see that you all bright minds at a young age are eager to get involved in the energy sector issues and solve them from a different perspective ultimately, playing a huge role in future of energy sector."

R K Srivastava
Former Director (Exploration), ONGC
Mentor, Oil & Gas World Expo 2023

ओएनजीसी
ONGC

"It was a well-organized Oil & Gas Conference, I am happy to be associated with the event. The contemporary relevant technical discussions through well-structured panels and Keynote addresses were icing on the cake. I thank the organizers for everything and wish many more successes in future."

Pankaj Kumar Goswami
Director (Operations), Oil India Ltd.
Co-Chairman CAB
Oil & Gas World Expo 2023

ऑयल इंडिया लिमिटेड
Oil India Limited
Conquering Newer Horizons

"All the senior members from the energy industry fraternity that have gathered here in the Oil Gas & Power Conference organized by Chemtech, I would like to address them as Energy Warriors who are fighting day-in & day-out to run each and every wheel of this country & are committed towards achieving energy self-sufficiency for our country India."

Subramanian Sarma
Wholetime Director and
Sr. EVP (Energy), Larsen & Toubro

LARSEN & TOUBRO

"We have witnessed quite a few once in a century event happening in a brief period of last 3 years which brought in a lot of global uncertainty while at the same time opening up a significant number of opportunities. How rapidly industry can adapt and capitalize on these opportunities is going to set up the next generation. Chemtech team has done a great job in organizing a very well-structured energy industry meet with good emphasis on latest technology display and knowledge sharing sessions and most importantly, inspired and engaged young students for connecting with the industry."

Impression

Rajeev Mathur
Director, HCG Group
Convener, Gas World Tech Expo 2023

"India is already playing global role in energy transition and has taken lead in net zero. But what we require is a clear path and respond more positively to climate change with minimum economic disruption. The path towards green energy is through hydrocarbons. Going forward, the refineries need to be more efficient, cost effective & reliable, and take the petrochemicals route. Gas is cleanest of all the available hydrocarbons, is affordable & available in abundance. India has done commendable job in terms of use and development of LNG infrastructure, but what we need probably is greater storage to offset the volatility in terms of availability and pricing especially in times of geopolitical turmoil. Service providers will play very important role in this journey and developing local supply chains can significantly mitigate the risks in time of geopolitical turbulence. For energy security & transition, existing industry that has brought us to the level of development, has to be sustained. Long term solution lies in coexistence of conventional fuels with new ones to achieve the targets that we have set in the long run."

Rajarshi Gupta
Managing Director
ONGC Videsh Limited

"Oil & Gas for the foreseeable future is here to stay and this means we will have to be more responsible, much more sustainable, much more environmentally friendly as we have to look at future generations as how we can add new talent to this sector and enable them to solve Oil & Gas issues of today and tomorrow. And I strongly believe if we are considered as culprits for Climate problems then, I also strongly believe that solutions to these problems will come from us only."

Ashu Shinghal
Managing Director
Mahanagar Gas Ltd

"Gas based economy, regulation & policy and energy transition framework is a very vast subject. But just to correlate moving forward as gas based economy, we have created lot of infrastructure and since inception of PNGRB, CGD has received significant impetus. Currently, CNG is facing the challenge due to increasing demand of EVs but there has been policy support to enable the development of PNG network to divert the LPG to the rural areas where cost of setting up CGD infrastructure & getting conversions are very high. We cannot say that in next 10 years fossil fuel will be phased out because it will require adequate infrastructure, CAPEX, resources to scale up and policy push for commercial viability. In my view, market will be determined by the fuel demand driven by customer's choice and commercial viability, and environment will play an important role for sustainable development."

C Mathavan
ED-Asset Manager, Mumbai High Asset
ONGC Ltd.

The Chemtech Team organized a splendid integrated energy exhibition from March 1-3, 2023 in Mumbai that was a unique combination of a knowledge platform and a vast networking platform. The organizing team made extensive arrangements to host a huge gathering from diverse fields of work, and despite the large magnitude of the event, everything was very orderly. The ONGC family delegates immensely benefitted from this show. The conference provided an excellent platform for the exchange of innovative ideas and profound insights on Decarbonization in the oil and gas industry, as well as Surface engineering and Corrosion control. It was my privilege and pleasure to interact with such a diverse and engaged audience that included key decision-makers and subject matter experts from the energy industry. I look forward to participating in future conferences organized by the Chemtech team.

आज़ादी का अमृत महोत्सव

ओएनजीसी ONGC

The Planet

पर्यावरण के प्रति प्रतिबद्ध ओएनजीसी

We have been consciously working on a plan to save the only known home to life- Planet Earth. That is the reason you will find multiple initiatives by ONGC for a sustainable future.

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Oil and Natural Gas Corporation Limited

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Innovative & Reliable: Tapflo Hose Pumps

High pressure hose pumps (PT series) combine the best available materials with smart design solutions in order to maximise running time and minimise maintenance.

The PT series pump is an extremely reliable pump with a wide performance range, up to 150 m3/h and 15 bars, that can handle most fluids in most applications.

Typical applications: industry, paint, water treatment, food industry, paper mills.

Effective hose pump solutions for difficult, abrasive, corrosive & viscous liquids with particles (PT series)

The PT series is designed to make those changes quick and easy with no technical knowledge required. We only work with high quality compounded rubbers, reinforced with 2 to 6 individual layers of braided polyamide and with an outer layer made to strict tolerances to ensure perfect compression. The characteristics of Tapflo hoses enable them to last approximately 30% longer than other hoses on the market. They also fit the majority of other hose pumps.

The best solution for simple transfer or dosing applications, allowing you a quick hose exchange to optimize pump operation time (PTL series).

Suitable for pumping and dosing low or high viscous, pasty, pure, neutral, aggressive or abrasive liquids, those containing gases, or which tend to froth or those containing solids in the following industries: paint, dairy and beverage, meat and fish processing, pharmaceutical and cosmetics, wastewater and water treatment, chemical and petrochemical industries, pulp and paper, textile, soap and fats, building, ceramics.

Exceptionally low shear, ensuring product quality, accurate and predictable performance

with subsequent savings.

Tapflo hose pumps Features and Benefits

- Safe to run dry: easy to use, no monitoring required.
- Few components: the only wear part is the hose, there are no valves, low maintenance costs
- High viscosity: up to 100,000 mPas can be conveyed
- Self-priming: hardly any other type of pump achieves the suction power of a hose pump of up to 9.8 m dry suction height for water
- No turbulence: in the case of highly abrasive media, gentle, low-wear pumping takes place.
- Also, for sensitive media.
- Dosing accuracy: up to ± 5%
- Peristaltic pumps are ideally suited for pumping highly abrasive media.
- Conveying direction reversible: simply change the direction of rotation to empty lines
- Adjustable: by changing the speed, e.g., using a frequency converter, the delivery rate can be regulated, also for dosing tasks
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Tapflo Group is an independent, Swedish, family owned, manufacturer and global supplier of Air operated diaphragm pumps, centrifugal pumps, hose pumps and other industrial process equipment.

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Founder
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Bharat Enterprises established in 1973 by Bharat Doshi, is engaged in importing stocking and supplying of carbon steel, alloy steel and stainless steel pipes & tubes. We also offer these products in customized options, as per our client's specifications and requirements. Our name is known for finest quality durability and efficiency. These are used in various industries which include:

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Mr Atul Gupta, Director (Commercials), & Shri Rajiv Agarwal Director (Technical), EIL

Mr Nishikant Ektare, Managing Director, ISMT

Mr Rajeev Gupta, Director (Projects), EIL

Bharat Enterprises meeting with Russian Delegation

Mr D S Nanaware, Director Pipelines, India Oil Corporation Ltd.

50th Year Celebrations

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IMPACT FEATURE

AI based systems add value to OPEX of End Users

Atul Raje
Managing Director
Samson Controls

What are the latest products that Samson showcased at Oil Gas & Power World Expo 2023?

FOCUS-ON is a SMART Valve in the process industry requirements and is equipped to provide consulting services around optimization of process loops using the FOCUS-1 compact Design and Solutions. This brings the complete control loop in to one valve, reducing cost and space for piping lengths and allowing control loop to be much smaller. Raising Stem Ball Valves, Triple Offset Valves, and Ceramic Valves are critical solutions provided by Samson.

Tell us about the applications of these new technologies & their relevance for buyers.

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Walk us through the future plans of your company.

Samson Controls plans to enter the digital space in the process industry to support Asset Management, and Asset Optimisation of our end users. ■

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Our Flagship product "Cavity Filled Flush Bottom Ball Valves" has its registered patent are duly certified by SIL by Exida and Fire safe by TUV. SIL–3 for Ball Valves, Butterfly Valves & Actuators and **IBR Certification** for Ball Valves & Butterfly Valves with its recent development in **Trunnion Ball Valves up to 16"**

Micro Pneumatics Pvt. Ltd is a Member of KITZ Group Japan, which is one of the largest manufacturers of Valves & Valves Automation in the world. As of worldwide, the KITZ group has 36 consolidated subsidiaries.

Our merger with KITZ brings us one step closer to accomplishing our goal and having a strong relationship and mutual trust, and aim to build high quality and noble business for the world.

Micro has already been involved in manufacturing quality standards and customized valves and valve automation systems as per customers' requirements and we assure to continue with the same products with further improved quality and better delivery scheduled for customer satisfaction.

Our full fledge manufacturing unit at 2 locations, Vasai (W) and Vasai (E) incorporate various independent departments such as Design, Cost & Estimation, Quality Assurance / Inspection, Purchase / Stores, Production / Planning, Assembly / Service and Dispatch.

"MICRO" Products are performing to the utmost satisfaction of our customers from various Industries such as Petro – Chemicals, Power, Fertilizers, Pharmaceuticals, Food Fiber and other Industries resulting in the manufacturing of customized valves.

MICRO PNEUMATICS PRIVATE LIMITED is a one-stop solution for Valve and Valve Automation Systems under one roof branded as **"MICRO"**.

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Valve & Valve Automation System

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- Soft Seated Ball Valves & Butterfly Valves with Automation
- Butterfly Valves, Dampers & Ball Valves with Automation
- Cavity Filled Ball Valves with Automation
- Cryogenic Ball Valves with Automation
- Jacketed Ball Valves and Jacketed Flush Bottom valves with Automation
- Accessories – Solenoid Valves / 3 Position Systems / 4 Position System

OUR PRODUCT RANGE

1 Piece Cavity Filled Step In Jacketed

1 Piece Cavity Filled Flange End Step In

3 Way 120

Lined BFV

Tri Port

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Jacketed Ball Valve with Gear Box

Trunnion Design Ball Valve with Rack & Pinion Actuator

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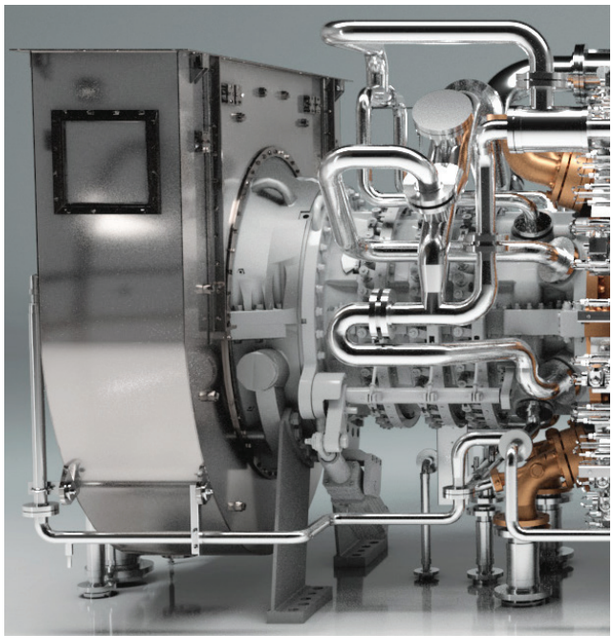
APAR Industries Ltd



Eni Lubricants is the biggest industrial house in Italy and amongst the largest in the world. With presence in over 100 countries, the group offers 400 plus variants of lubricants to consumers. In India, APAR Industries Ltd, a 6-decade year old company, among the most established companies in India have tied up with Eni for manufacturing & marketing world class lubricants.

OUR PRODUCTS FOR OIL & GAS INDUSTRY INCLUDE

- **Eni OTE GT**

Turbine oil, approved by major Global OEM's

- **Eni Turbo 23699**

A synthetic lubricant developed expressly for use in marine and industrial aero derived gas turbines, approved by major Global OEM's.

- **Eni Geum NG 40**

A lubricant for modern stationary engines, spark-ignition type, burning natural gas, methane or biogas where a low ash oil is required, approved by major Global OEM's.

How can Eni OTE GT 15 help you to increase the efficiency of industrial turbomachinery and to respect the environment?

If your ambition is to increase the efficiency of your industrial turbomachinery, Eni OTE GT 15 makes it possible. Eni OTE GT 15, developed thanks to the partnership with a major global OEM, is the first turbine oil *Energy Saving* able to break through the standard technology limits fixed to ISO VG 32.

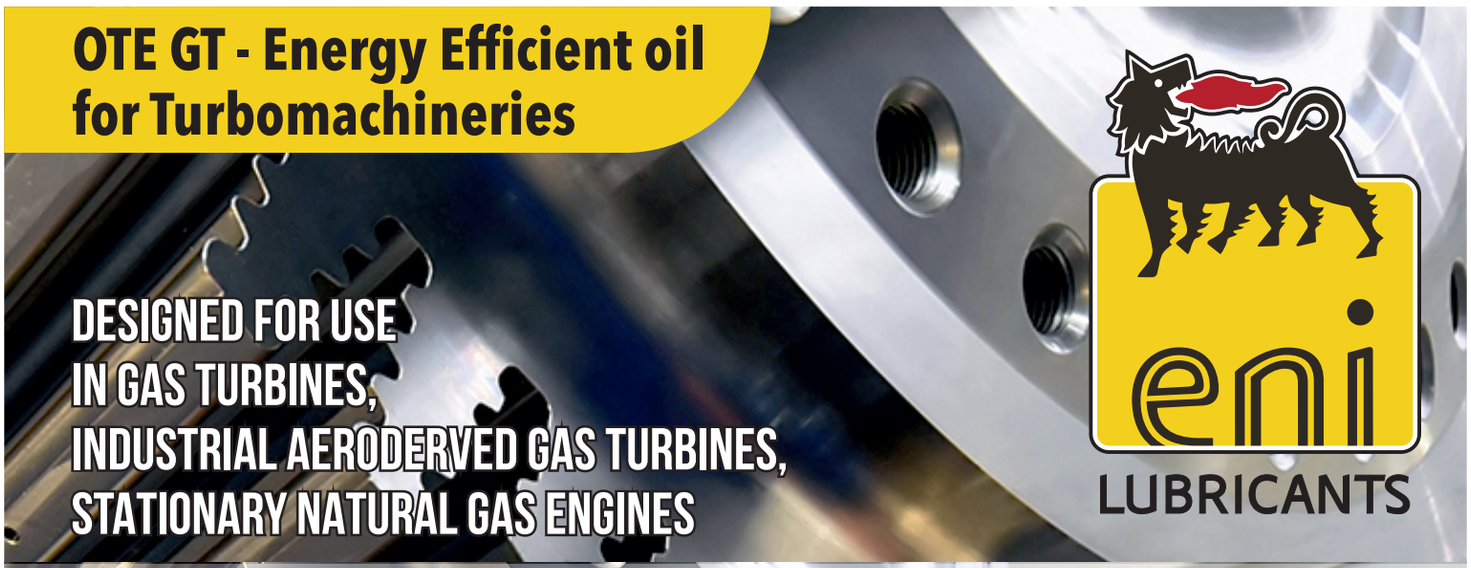
The new Eni OTE GT 15 formulation allows excellent aging resistance, advanced wear protection and can help to protect your components from damage.

Why Eni OTE GT 15 is an energy saving product?

- By switching from an ISO VG 32 to Eni OTE GT 15 on a 30 MW natural gas turbine, customers reported that it Reduces CO2 emissions of 240 ton/year
- Saves 120,000 SMC/year of natural gas
- Reduces mechanical viscous losses from 5% to 15%
- Increases the overall machinery efficiency up to 0.3% ■

Website: https://oilproducts.eni.com/

OTE GT - Energy Efficient oil for Turbomachineries



DESIGNED FOR USE
IN GAS TURBINES,
INDUSTRIAL AERODERVED GAS TURBINES,
STATIONARY NATURAL GAS ENGINES

eni
LUBRICANTS

- Strong Oxidation Resistance
- Advanced Antiwear Properties
- Outstanding Air Release
- Excellent Thermal Stability and Outstanding Protection Against Varnish

CONTACT US

Contact Address: Apar Industries Ltd - Eni Lubricants Division
18, TTC., MIDC Industrial Area, Thane Belapur Road,
Opp. Rabale Railway Station, Rabale, Navi Mumbai - 400701, India.
Contact Number: +91 22 6111 0444 / 6123 7555
email: eni.communications@apar.com
URL: www.apareni.com

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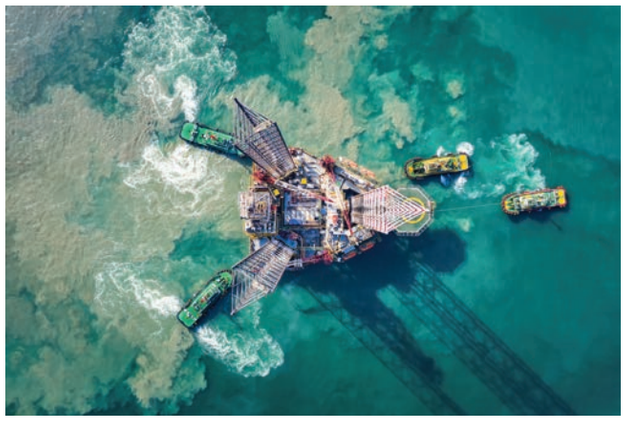
India's efforts in energy transition

Baker Hughes

Neeraj Sethi
Country Director - India
Baker Hughes



India is the world's third-largest economy with a rapidly expanding population, and hence there has been a substantial increase in energy demand. The energy sector in India has been highly dependent on oil and gas, with the sector being one of the eight core industries that influence major decision-making for other sectors. As the sector is a major factor in the country's economic growth, the demand for oil and gas is expected to increase making the sector favourable for investments. The country has been predominantly reliant on power generation from fossil fuels, and 59 percent of the country's total installed capacity comes from coal, lignite, gas, and diesel sources.

The Government of India has regulated several policies enabling 100 percent Foreign Direct Investments (FDIs) across sectors including natural gas petroleum products and refineries, among others. According to the updated Nationally Determined Contributions (NDCs), the country aims to increase the total share of installed non-fossil capacity to 50 percent by 2030. Indian government has regulated various policies and measures such as the Green Energy Open Access Rules 2022, Green Hydrogen Policy, production linked incentive scheme, the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-Kusum), etc, to reinforce the government's commitment to renewable sources of energy.

A transition to clean energy presents itself with numerous opportunities and India's target for 2030 and 2070 encourages the energy sector with immense optimism. The country focuses on attaining net-zero carbon emissions and strengthening bonds with international entities and countries is giving a boost to its transition towards a green economy. During the COP 26 summit, the Prime Minister of India laid out the country's commitments to increase efforts in climate action by revealing the Panchamrit statement.

The global scenario in the efforts towards climate action has been tremendous and countries, as well as private entities are ensuring the adoption of sustainable practices in their operation, not only developed countries, but developing countries are too realising the importance of sustainability for a prosperous future and are taking appropriate steps to safeguard the ecosystem.

Oil and Gas Sector

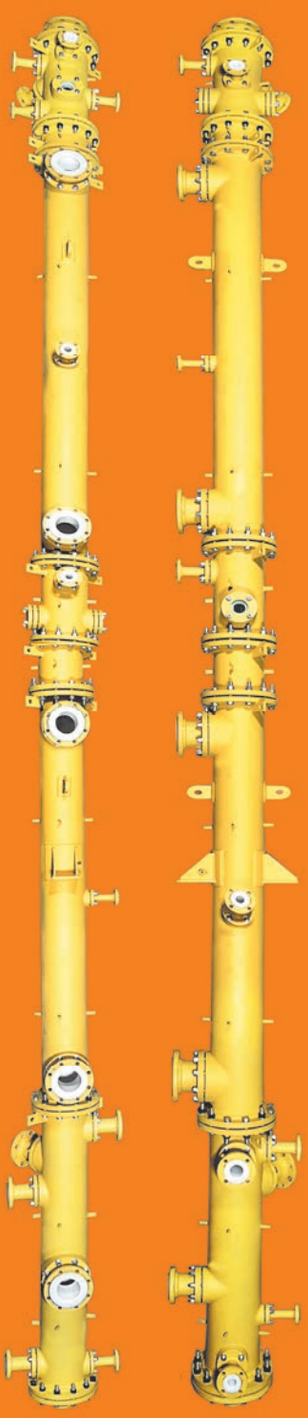
The oil and gas sector faces a challenge in engaging in and adapting to a shifting environment for investment and policy, as well as in evolving in ways that don't just support but also contribute to and possibly even lead efforts to decarbonize the energy system.

If today's oil and gas operations were 10% more efficient, we would save ~500 million tons of CO_2 per

ResistoTech
solution to corrosion

Manufacturer of:
Lined piping systems, Columns, Vessel and Tanks for corrosive media applications

Lining Material: PTFE/PFA/FEP/PVDF/PP/HDPE



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- Liners thickness from 2 mm to 14 mm as per application
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- Liner lengths 6400 mm upto 400 NB and above all 3200
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- Minimizing joints by longer lengths -saves product and installation cost
- **Full vacuum upto 200 Deg C in any size**
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- FDA certificate and compliance

Techno-commercial solutions provider with pre-engineering and case study of corrosion issues

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year. That represents a contribution of 5% per year of the emissions reduction target of the Paris Agreement climate goals. Reducing emissions from core oil and gas operations is a first and critical step to meeting global and industry emissions targets. These solutions can be relatively lower in capital investment and provide more immediate results in terms of emissions reductions. We are focused on developing and deploying these technologies in our own operations and for our customers to ensure we are cutting emissions while we invest in and advance a sustainable energy future.

Baker Hughes: Emission Reduction

We at Baker Hughes, have been working towards solving emission reduction rather than eliminating a fuel source under various projects across the globe. We are developing low and zero-carbon technologies that support emissions reductions and decarbonization, which are some of the practices that will be essential to boost the energy transition efforts of India.

Baker Hughes is one of the first companies to commit to attaining net-zero emissions and is working towards improving the overall efficiency of operations. The company employs a standardized approach towards energy-efficiency evaluations, decision-making, and tracking improvements in its sustainability principles. We also continue to innovate new low-carbon products and services to help our customers reduce their emissions from oil and gas operations as well as to support the future energy mix that includes a range of alternative and renewable energy sources.

Our capabilities in carbon capture, use, and storage; hydrogen; and energy storage, are gaining prevalence in the market. The company has been engaged in these fields, with hydrogen since 1962, geothermal since the early 1990s, and CCUS since the early 2000s. As India is leaning towards a clean energy transition, these areas gain more relevance for Baker Hughes as we are constantly developing technologies to cater to the needs of tomorrow. The BHC3 Energy Management application, helps energy, sustainability, and facility managers, and C-suite leaders reduce energy consumption levels. The application offers forecasting energy loads to reduce peak demand, automatically detecting anomalous behaviours and billing errors,

regulatory reporting, facility monitoring, and optimizing portfolios of capital.

With the increasing global efforts to achieve the Sustainable Development Goals (SDGs) and the technological developments that are emerging to boost these efforts, the future of the world looks brighter with optimum energy turnaround. Baker Hughes looks forward to providing technical solutions in India that will help lower emissions by utilising a wide array of services from its portfolio of Industrial Energy Technology, including Climate Technology Solutions that will boost the decarbonisation process. The company aims at leveraging its core technological capabilities in India and contribute to its net-zero efforts. We have been proactive at our engagements with policymakers, associations, and customers to promote public policy priorities to address climate change while meeting energy needs of the society.

India has accomplished significant improvements in energy access and development of cleaner energy in the past years. Government support at the central and state levels has played a crucial role in this progress. The government has the power to facilitate the transition with incentives, infrastructure, and policy support and by encouraging cross-industry collaboration. This would be a perfect situation for India to capitalise and facilitate a stable energy grid for the economic growth of the country. ■

Website: https://www.bakerhughes.com/

We take energy forward

We're committed to making energy safer, cleaner, and more efficient for people and the planet. By combining industry-leading technologies and services with operations in over 120 countries, we're collaborating with customers to transform the future of energy – everywhere.

bakerhughes.com

Baker Hughes

***DelVal Flow Controls** is pleased to offer a variety of "workhorse" butterfly and ball valves applications prevalent in the industry, from cooling water, water treatment, condensate desulphurisation systems in all power plants. Typical applications in this environment vary particles. DelVal valves perform robustly in all these applications.*

DelVal Series 50/52 Resilient Seated Butterfly Valves provide the most economical solutions for highly corrosive and abrasive applications.

1) Disc
High strength disc with hand polished edges and smooth surface and polished to prevent accumulation of corrosive slurry and pitting corrosion. The material options available are Hastelloy®, Super duplex stainless steel for wet FGD applications and with Nylon PA 12 disc coating for dry FGD applications. All options provide excellent corrosion resistance to all types of FGD process fluids.

2) Stem
One piece stem with close tolerance double D drive eliminates the need for disc screws or taper pins.

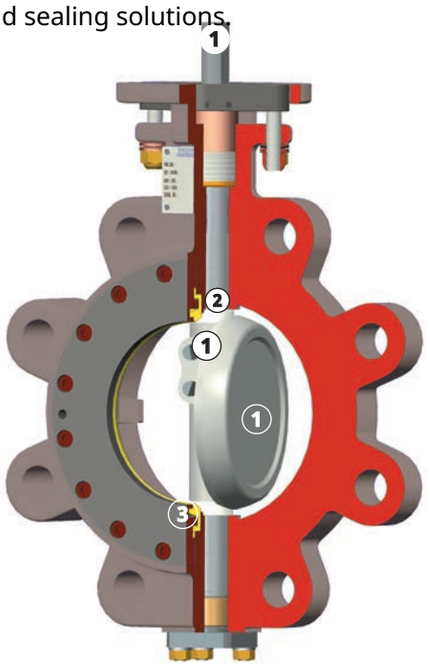
3) Seat
Unique heavy duty "Center-Lok®" seat design available in different elastomers, fits tightly in precision square grooves in the body and provides highly dependable sealing in all demanding applications.

DelVal Series 44/45 Double Eccentric High Performance Butterfly Valves provide the best high pressure and high temperature zero leakage, bi-directional fluid sealing solutions.

1) Disc & Stem
High strength stainless steel disc and stem assembly is engineered to maximize flow and provide maximum strength for high pressure applications. The disc + stem are assembled by two uniquely designed wedge pins to provide a positive mechanical attachment. Stem seal assembly is live loaded with Belleville springs to ensure constant tight sealing of stem packing emissions.

2) Bearings
The drive and non-drive end stem "Bear-X" bearings are made out of an engineered high compressive strength composite polymer material having excellent thermal, chemical and wear resistance .

3) Seat
The unique seat design utilizes a flexible lip seal concept. When the disc closes, this action causes a slight deflection in the seat, energizing the seat. During this energized position, the seat has a stored energy force constantly pushing against the disc. In addition to this "energized" force, when pressure is on the insert side, the pressure pushes under the lip which further amplifies the sealing force between the disc and the seat.



3-YEAR WARRANTY ON DELVAL PRODUCTS

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DelVal Flow Controls USA
6068 Highway 73
Geismar, Louisiana 70734 | USA
T: +1 833-DELVAL1
sales@delvalflow.com

Manufacturing & Sales - International
DelVal Flow Controls Pvt. Ltd.
Gat No: 25, Kavathe
Post-Javale, Tal. Khandala
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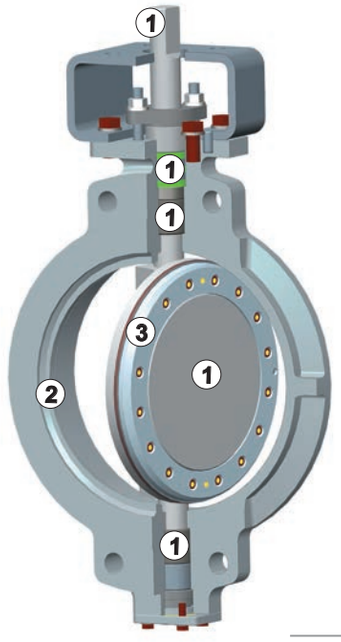
for the power generation industry. DelVal valves are designed and manufactured to handle all challenging handling, deaerator, catalytic reduction, to highly corrosive and abrasive applications in the wet flue gas from clean fluids to aggressive fluids with high concentration of chlorides, fluorides, and abrasive solid

DelVal Series 4 Triple Offset Valves provide the ultimate sealing solutions for combination of high pressure and very high temperature. They are designed for bi-directional, zero leakage sealing for extended periods.

1) Disc & Stem
Robust disc + stem assembly designed for minimum pressure drop is supported with large SS316+Nitriding bearings at both ends. Combined with live loaded gland assembly of multiple graphite rings for sealing fugitive emissions tightly, provide the most dependable sealing under highly demanding conditions.

2) Seat
Seat is integral on body and is hard faced with Stellite or suitable alloy. Seat is precision machined to ensure perfect match with the seal ring. This (a) provides bubble tight seal,(b) prevents galling and friction during seating and unseating, (c) provides resistance to erosion during high velocity fluid flow and (d) prevents corrosion due to media.

3) Seal Ring
Conical, laminated seal ring is located on the disc. It is precision machined for bi-directional, bubble tight sealing. Alternating layers of metal and graphite flex generate a circumferential compressive force on the precision machined hard face seat on body. Metal laminations in stainless steel or Inconel provide a rigid back up for the soft graphite laminations. This combination makes the seat suitable for bubble tight sealing at high and low temperatures alike. Seal ring is replaceable.



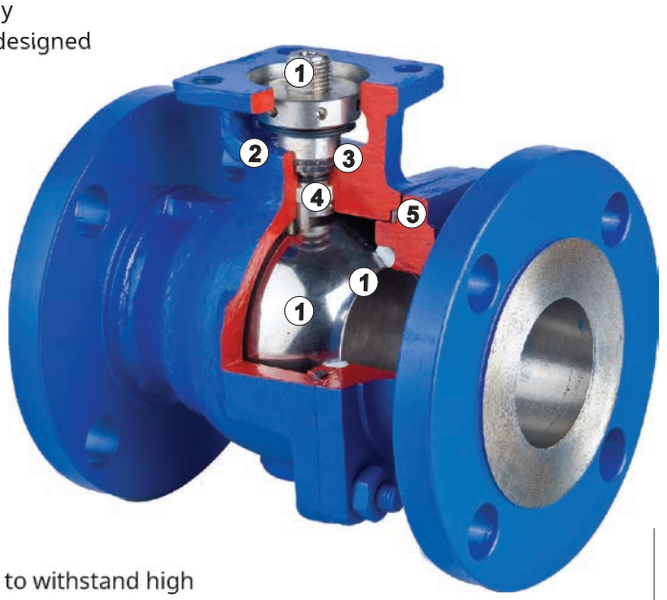
DelVal Series 65 - 72 Full Bore Ball Valves highly dependable zero leakage sealing and full CV flow with low operating torques. Unique features built in the products differentiate the valve from other similar products available.

1) Ball
Precision machined spherical ball with superior finish, positively engaged with heavy duty stem and located between specially designed and contoured seats provides dependable, zero leakage seal.

2) Adjustable Packing Gland
Packing gland bolts are easily accessible to adjust packing with the actuator in place.

3) Stem Sealing
Stem packing in graphite is live loaded with the gland assembly to ensure positive and trouble free sealing. Online tightening of gland assembly can be done. O-ring provides sealing against fugitive emissions.

4) Stem Bearing
Heavy-duty reinforced Teflon® bearing is provided to absorb side and thrust loads. It also reduces stem torque, protects stem packing from deformation and gives extended stem sealing life.



5) Body Seal
Body joint sealing is by a graphite / reinforced graphite gasket to withstand high temperatures and is contained in a precision-machined groove for extended sealing life.

All products are designed, manufactured, and tested by employing modern manufacturing practices under a robust and certified quality management system. For more details of our company and products, please visit www.delvalflow.com. Please email to salesindia@delvalflow.com and our application experts will help you find the right solution to your flow control requirement.

Delivering Excellent Energy Efficiency via parts made from PEEK & PCTFE

Sharad Mhaske
Director
Mask Group

What are the latest products Mask Seals showcased at Oil Gas & Power World Expo 2023?

At the Exhibition we launched our High-Pressure Valves seats, PEEK, FILLED PEEK and PCTFE products. Which is used in high pressure and temperature applications. And we are leaders in thermoplastics and PTFE

Tell us about the applications of these new technologies & their relevance for buyers.

We make energy efficient parts out of PEEK and PCTFE. These are helping company in carbon neutral as also in increased MTBF. We follow global standard of manufacturing.

Walk us through the future plans of your company.

MASK believes in being innovative to provide Solutions to the Customers. As a part of Backward Integration, we are on the verge of starting our new Forging Plant at Chakan MIDC. The whole idea of this Forging Plant has brought in more Control on the Quality, Delivery and Reliability. This Plant will be in Full Operation from April 2025.

Vision of MASK is to also do Forward Integration. Hence as a part of this long-term Vision, we are working on building the necessary Infrastructure for Development and Manufacturing of PEEK & PTFE for the Oil & Gas Industry. ■

Website: https://maskseal.com/

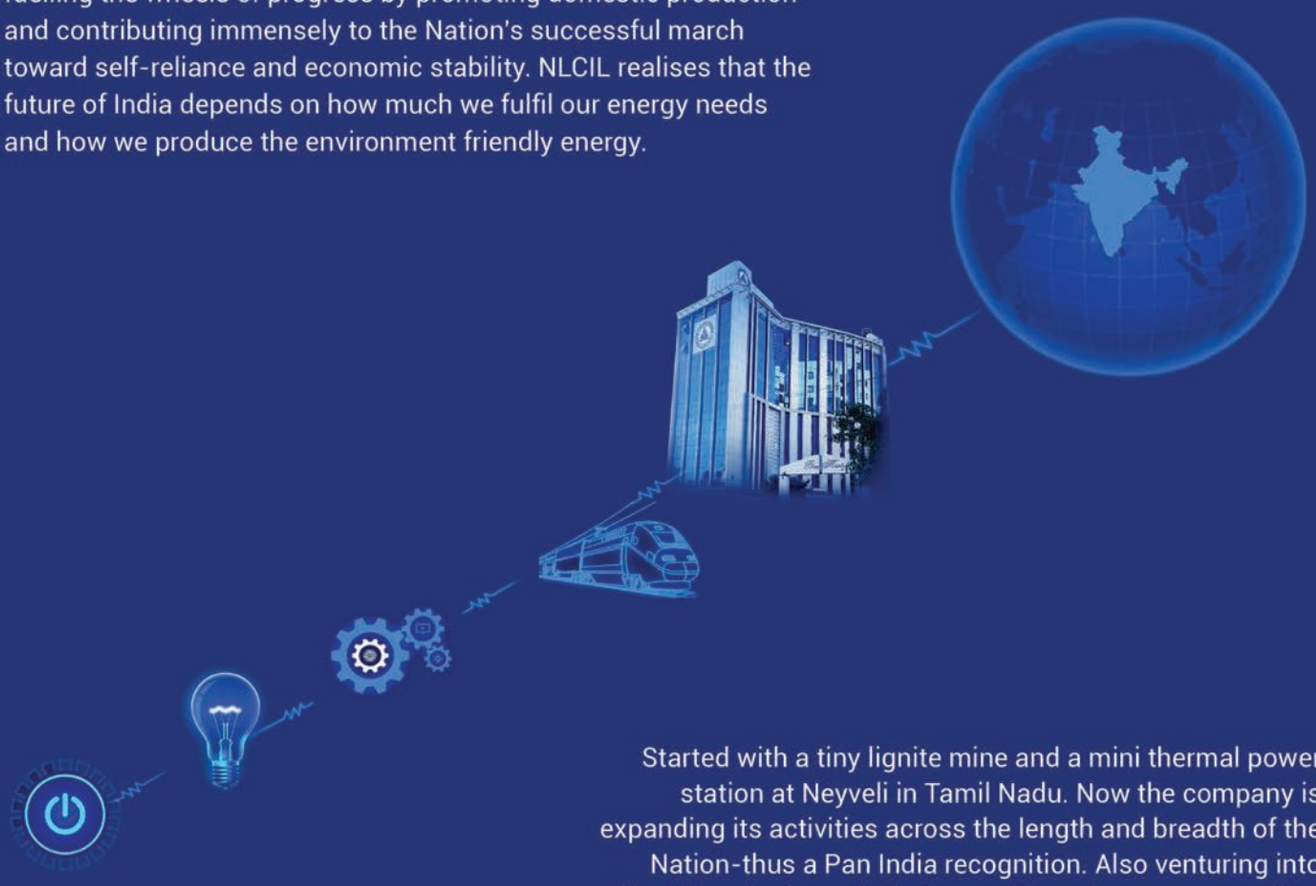
Azadi Ka Amrit Mahotsav

G20 भारत 2023 INDIA

Celebrating 75th year of India's Independence...

Feel Powerful Freedom from Power Cuts!

For the past 66 years NLCIL is tapping the natural resources and fuelling the wheels of progress by promoting domestic production and contributing immensely to the Nation's successful march toward self-reliance and economic stability. NLCIL realises that the future of India depends on how much we fulfil our energy needs and how we produce the environment friendly energy.



Started with a tiny lignite mine and a mini thermal power station at Neyveli in Tamil Nadu. Now the company is expanding its activities across the length and breadth of the Nation-thus a Pan India recognition. Also venturing into diversification in coal mining, coal based power generation, renewable energy (solar & wind) etc.,

We have a comprehensive strategic plan to become a 17000+MW Power company and 84+MTPA Mining Company.

Lignite Mining
32.10 MTPA

Coal Mining
20.00 MTPA

Lignite based Power Generation 3640 MW

Coal based Power Generation 1000 MW

Renewable Energy (Solar) 1370 MW

Renewable Energy (Wind) 51 MW

MTPA: Million Tonne per Annum / MW: Mega Watt

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CREATING WEALTH FOR WELLBEING

NLC India Limited

'Navratna' - Government of India Enterprise

Corporate Office: Block 1, Neyveli-607 801, Cuddalore District, Tamil Nadu

Regd. Office: 'Neyveli House', No. 135, E. V. R. Periyar High Road, Kilpauk, Chennai - 600 010, Tamil Nadu

CIN: L93090TN1956GOI003507 | Website: www.nlcindia.in

Jindal Stainless: India's Leading Stainless-steel Company

Jindal Stainless (comprising Jindal Stainless Limited and Jindal Stainless (Hisar) Limited) is India's leading stainless-steel company with its manufacturing plants in India, located in Hisar and Jaipur, and an overseas unit in Indonesia. Both the plants together have an annual melt capacity of 1.9 million tonnes (MT) and an annual turnover of USD 4.20 billion (as of March'22). With its inception more than 50 years ago, the company continues to carry a strong vision to improve lives through stainless solutions.

Committed to its responsibility towards the environment, the company is taking a number of initiatives to reduce its carbon footprint and achieve its Environmental, Social, and Governance (ESG) targets. It is continuously investing in low carbon technologies, recycling processes, digitalization and upgradation for energy efficiency projects. It is determined to power future growth through renewable sources of energy only and aims to commit to Net Zero by 2050.

Jindal Stainless' product portfolio consists of various series of grades ranging from 200 Series, 300 Series, 400 Series, Duplex, Super Duplex & Super Austenitic Stainless steel grades in various product forms & finishes like slabs, blooms, coils, plates, sheets, precision strips, blade steel, and coin blanks. Jindal Stainless has added various new products in its portfolio like Hot Roll Bonded clad Plates, Chequered Plates etc

New Products in Jindal Stainless' Portfolio:

- Hot Roll Bonded Clad Plates,
- Chequered Plates etc.

The company caters to the most quality-conscious & critical application consumers, not only in the domestic market but also in the export market across the Americas (USA, Brazil, and Mexico), Europe, and Russia, with an ever-expanding customer base in other countries.

The company is continuously working closely with various strategic customer in solution-oriented approach in order to provide cost-effective, sustainable & lasting solutions to its customers.

Aerial view of Jindal Stainless Hisar Plant

Some of Jindal Stainless' key consumer industries consist of strategic segments such as

- Nuclear
- Thermal
- Hydroelectric, renewables
- Oil & Gas,
- Petrochemical
- Water treatment
- Chemical processing

Apart from architecture, building, and construction; automotive and transport; railways, consumer durables, precision strip and blade steel, coin banks.

Jindal Stainless has four subsidiaries in total –

- Jindal Stainless Lifestyle Limited (JSLL), a unit to cater to lifestyle sector
- Jindal Stainless Steelway Limited (JSSL), an array of service centres in India
- PT Jindal Stainless, Indonesia (PT JSI), a cold rolling mill in Indonesia
- Iberjindal Stainless (Iberjindal S.L.), a service centre in Spain to cater to European markets.

Jindal Stainless is at the final stage of merging its two companies, Jindal Stainless Limited and Jindal Stainless (Hisar) Limited. It is also going to expand its capacity to meet the growing demands of key economic segments. Post the merger and capacity expansion, Jindal Stainless will be one of the largest stainless-steel manufacturers in the world with an annual melt capacity of nearly 3 MT and will enter the league of top 5 global stainless-steel producers. . ■

Website: https://www.jindalstainless.com/

PRECISION, SIMPLICITY, COMPATIBILITY.
THE 6X®. OUT NOW!

The new 6X radar level sensor is so easy to use, it's simply a pleasure. Because we know customers value not just 'perfect technology', but also making everyday life better and less complicated. We wouldn't be VEGA if measurement technology was our only value.

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VEGA

Fluid sealing technology at-par with Global Standards

Garlock

For more than 130 years, Garlock has stood at the forefront of fluid sealing technology. Our history of growth and success is rooted in our commitment to deliver the most innovative sealing solutions and unparalleled service to the world's processing industries.

Garlock India Private Limited is located at Pune, Maharashtra to serve the customers faster in the region.

Garlock Sealing Technologies has global manufacturing facilities which collectively produce the world's broadest range of fluid sealing products specifically designed for industrial applications.

- Mining Industries
- Pulp and Paper Industries
- Hydroelectric Industries
- Wastewater & Water Treatment Industries
- Power Generation Industries

We have developed Application Engineering Department to study your applications and we will partner with you to develop and test solutions for your toughest sealing applications whether you are in design stage for a new project or trying to solve an existing problem.

PRODUCT RANGE				
GYLON®	Metallic gaskets	Mechanical seals	Valve stem packings	Klozure® Oil Seals and Bearing Isolators
BLUE-GARD®	Gaskets for oxygen services	PS-SEAL®	Braided packing	Rubber and Metallic Expansion Joints
GRAPH-LOCK®	THERMa-PUR™ (for high temperature applications)	Cefil'Air® Inflatable Seals	Diaphragms	Chevron Packing Sets for Gear boxes

We have a wide range of next generation sealing systems which can replace the traditional one to get significant extended service life and that too at most economical cost!

Our major areas of working are:

- Oil and Gas Industries
- Fluid Power Industries
- Nuclear Power and Cryogenic Industries
- Chemical, Food Processing and Pharmaceutical Industries
- Agrochemical and Fertilizer Industries
- Space and Aeronautical Industries
- Valve, Pump and Rotary Equipment manufacturing Industries
- Steel and Cement Industries

Apart from our highly experienced and qualified technical team, we provide fast pre-sales and after-sales service. Needless to mention our high standard global quality system to assure the best product from our range. Apart from these, one of our strong pillars is our own Research, Development and Manufacturing of Raw Materials. We have a long list of patented raw materials and product designs to cater to your critical applications. ■

Contact:

Garlock India Private Limited
Address: Plot No A-88/89, "H" Block, MIDC Pimpri, Pune- 411 018, India
Landline: +91 020 6712 6601-15 ,
Fax: +91 020 6712 6699
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INDIA
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an EnPro Industries Compnay

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Proven reliability and safety assurance

GARLOCK THERMa-PUR™ is a proprietary new gasketing material designed for use in high temperature continuous upto 1000°C sealing applications. This is available in the form of flat cut gaskets, Spiral Wound Gaskets, Corrugated Metal Gaskets and Kammprofile gaskets.
Ideally suitable for: » Marine and Land-based Exhaust Systems, » Biomass Gasification Process, » Oil and Gas Production » Mineral and Fertilizer Processing » Incineration Process, » Co-generation Systems » Turbochargers Equipment, » Process Drying Equipment

Garlock offers high quality sealing solutions that comply with the most stringent environmental and safety requirements. Gasketing products are offered in a wide range of non-asbestos materials including GYLON® restructured PTFE gaskets,an industry standard for resistance to aggressive chemicals and its extreme grade gasketing with Flange-Free™ anti-stick coating.In addition, Garlock also manufactures gaskets for split casing pump applications. Available in full sheets or cut to customer specifications, our comprehensive range caters to any requirement from general service to critical duty applications. Safe, reliable gasket integrity is assured regardless of load requirement.

GRAPH-LOCK®| Multi-Swell™| GYLON® Style 3510 | GYLON® Style 3500 | GYLON® Style 3504

Have you encountered any sealing problems today?

Upgrade your applications with high performance Garlock sealing products.

Contact Garlock India Private Limited today for excellent sealing solutions
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Investments in R & D paving the way for expedited delivery of Seals' solutions

C Vishnu Vardhan
Managing Director
Rolon Seals

What are the latest products that Rolon Seals has showcased at Oil Gas & Power World Expo 2023?

Rolon Seals has developed a wide range of mechanical seals for various industries & applications over the last 23 years. At this expo we have showcased our mechanical seals used in the Oil, Gas & Power Generation industries. We are showcasing some mechanical seals for some critical applications in these sectors such as

- Boiler feed Pumps used in power plants.

- Our complete range of API 682 Seals used in refineries.
- Dry Gas seals used in compressors
- High pressure Pipeline seals that work at 70 Kg/ CM^2

Tell us about the applications of these new technologies & their relevance for buyers.

Rolon Seals is the first Indian company to start a R&D centre in India and dynamically test all our mechanical seals. At our R & D centre we can control parameters like Process media, temperature, pressure, RPM & flow, this gives us the ability to replicate actual working conditions at our R & D centre. We have a dedicated team of engineers who design and test all mechanical seals as per API 682 guidelines.

Rolon Seals has partnered with Fluid science Dynamics a Singapore based company to bring dry gas seal technology to India. Fluid science Dynamics has helped us set up a dynamic test rig for dry gas seals in Hyderabad. Our customers can witness these tests at our R & D centre in Hyderabad or we offer them remote web viewing of the test through the internet.

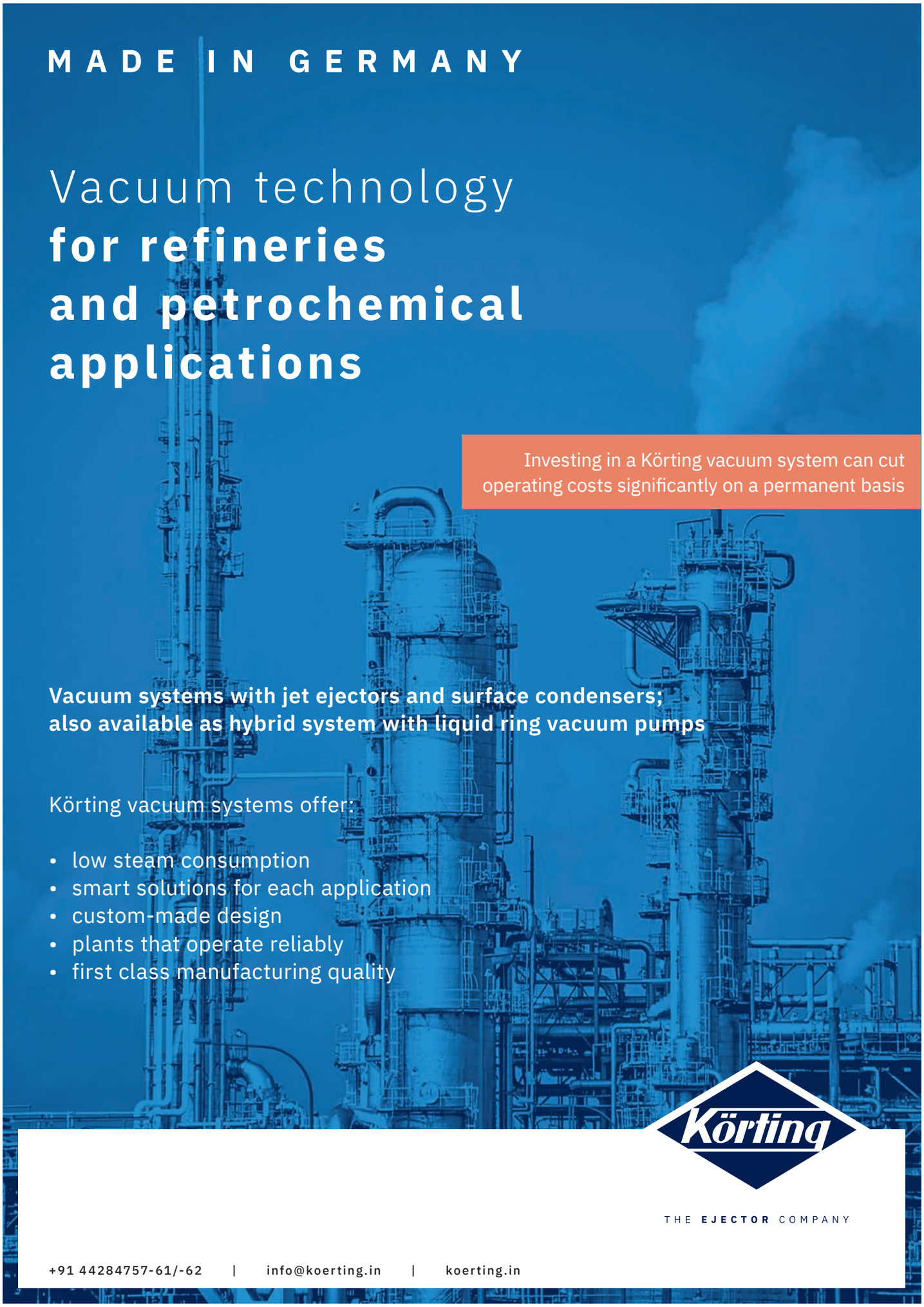
How is the competition evolving and how are you positioned in Indian and International markets?

The mechanical seal industry has always been dominated by German and American multinational brands. Rolon Seals has positioned itself globally to compete with these multinationals by starting more than 50 sales and service branches globally. We have a strong presence in more than 6 countries. Multiple stock points & Service centres across the world help us deliver & service our customers within 3 weeks beating the industry standard of 8 weeks.

Walk us through the future plans of your company.

Rolon Seals plans to Invest capital into the research & development of new products to enter the oil & gas space globally and to Start sales & Service offices in new locations across the globe so we can service and deliver our product to our clients faster. ■

Website: https://rolonseals.com/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Vacuum technology
for refineries
and petrochemical
applications
Investing in a Körting vacuum system can cut operating costs significantly on a permanent basis
Vacuum systems with jet ejectors and surface condensers;
also available as hybrid system with liquid ring vacuum pumps
Körting vacuum systems offer:
• low steam consumption
• smart solutions for each application
• custom-made design
• plants that operate reliably
• first class manufacturing quality
Körting
THE EJECTOR COMPANY
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Type tested certified products for Hydrogen Application

Vipul Panchal
Group CEO
HAVI Engineering India Pvt. Ltd

What are the latest products Havi showcased at Oil Gas & Power World Expo 2023?

At the Exhibition we launched our High-Pressure Valves & Fittings, especially for Hydrogen Services. The Range includes Cone & Threaded Fittings, Needle Valves, DBB Valves, Manifolds, Check Valves and Ball Valves. The Entire Product range is Designed and tested for Working Pressure Rating of 22,500 PSI. Apart from the H2 Service Valves & Fittings, we are also going to showcase our newly developed range of DBB Valves with Gate Valve as Primary & Secondary Isolation. This is a new Design which very few Indian & International Companies have developed which are installed at various IOCL Plants.

Tell us about the applications of these new technologies & their relevance for buyers.

Worldwide DBB Valves are used to minimize the Potential Leak path that happens by multiple Valves installation. These valves reduce the Time & Cost of Installation. But when it comes to Slurry Media, the traditional Installation of 2 Gate Valves with Globe Valve as Drain were used. With our new developed DBB with Gate Valves, now DBB can also be installed with Slurry Media. Thus, extending the benefits of DBB for Slurry Applications.

How is the competition evolving and how are you positioned in Indian and International markets?

Competition is utmost required as it keeps the company on its toes. As of now there is not any other Indian Manufacturer who has acquired the Type Test Certification of High-Pressure Valves & Fittings for Hydrogen Application. The Type Test Certification is as per EU 406 & ISO 79880-3 which has got very stringent requirements. We are in process to get our H2 Service Product range type tested for these Standards. Internationally only few renamed Competitors like Swagelok, Butech & Parker – Autoclave have got this Certification. Our aim is to be the first Indian Company to have the Products Type tested as per the EU and ISO Standard.

Walk us through the future plans of your company.

HAVI believes in being Innovative to provide Solutions to the Customer. As a part of Backword Integration, we are on the verge of starting our new Forging Plant at Chakan MIDC. The whole idea of this Forging Plant has brought in more Control on the Quality, Delivery and Reliability on Raw Material used for our Valves & Fittings range. This Plant will be in Full Operation from April 2023.

Vision of HAVI is to also do Forward Integration. Hence as a part of this long-term Vision, we are working on building the necessary Infrastructure for Design & Manufacturing of Chemical Injection Skids for the Oil & Gas Industry. ■

Website: https://havi.in/

"Once A SealMan Always A SealMan"

sealmatic®

Umar AK Balwa
Managing Director
Sealmatic

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

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

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

Way back in the early 1980s, the size of the mechanical seal market was merely ₹ 15 crores and today the same has grown exponentially at ₹ 1500 crores. The GDP of India is USD 3 trillion and is one of the strongest and biggest globally. The infrastructure and the core industry is growing at a rapid pace, and this will be the biggest driver for growth in the mechanical seal industry.

Having said that, back in the days there were hardly any indigenous mechanical seals company in the country, there were three big boys from Europe and USA, which totally dominated the market, until the Indian economy opened up in 1992 and created a level playing field where indigenous players like Sealmatic could acquire technology and equipments from the western world with ease.

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

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

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

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

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

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

How do you meet customer's expectations?

We are a team of 235 associates and out of which we have a dedicated team of 27 engineers who are employed for the sole purpose of designing individual solutions for customers globally. We are proud to state that we are the only Indian company which has the distinction of API Q1, ATEX & EU FDA certification for mechanical seals.

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

How is Sealmatic positioned in this segment?

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

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

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

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

We are the only Indian company which has the distinction of API Q1, ATEX & EU FDA certification for mechanical seals. Besides, again as a domestic mechanical seal company, we are the only one which employs FEA & CFD for hardcore design and development of mechanical seals.

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

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

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

Our specialty lies in designing and providing heavy duty mechanical seals for pumps, compressors, agitators and other rotary equipment. Applications where the pressure rating exceeds 100 kg/cm^2, temperatures in excess of 350 degree Celsius, slurry content of very high level, media with high viscosity and so on.

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

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

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

The future of Sealmatic and the Indian industry at large is bright, and it is our rightful place to be in the forefront of the mechanical seal industry in the global arena. We already have deliveried to more than 45 countries and want to be physically present with our sales & service centres in every continent.

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

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

Is there anything you would like to add?

"Once A SealMan Always A SealMan. ■

Website: https://www.sealmaticindia.com/

A project partner delivering Technology and Quality

Pranay Garg
Managing Director
Advance Valves

Advance Valves, which has many firsts to its credit, is around four-decade old company manufacturing Check Valves, Butterfly Valves (Manual as well as Automated) and Balancing Valves targeted at the oil and gas, refineries and petrochemical, power, water, fertilizer, steel and HVAC sectors globally.

Always a pioneer in valve engineering, Noida based Advance Valves has been recognized as a reliable source for specialized range of products with high tech engineering, cutting edge manufacturing and robust quality management systems. Globally, customers in the Oil & Gas, Petrochemicals, Power, Water and HVAC Particularly have found a partner for the success of their investments. With a mantra led by project partnering and customized solutions of adhere to each unique need of the customer, Advance Valves is approved and used by major end-users of valves and engineering companies globally. Its product performance and understanding with application orientation has been acknowledge to the extent of Advance being the first Indian Valve Manufacturer to be made a voting member of the API Standards Committee.

The Managing Director, Pranay Garg, envisioned Advance Valves as a company providing world-class technology solutions to global customers, ably aided by motivated employees. From an established market within India, Advance Valves has grown to having an enviable reputation across global majors. He shares how the global acceptance has evolved with times. "India experienced an extended phase of being a non-acceptable source, to being a destination for low-cost sourcing, which has changed to her being a high-value strategic sourcing partner, in the last 10-15 years. Advance Valves has been a torchbearer in this cycle and has been qualified with the apex Oil & Gas Industry users for more than a decade now." Today, Advance Valves business internationally has outgrown India business.

Product Innovation and Technology

All the key products in the Advance Valves portfolio have been a first to the Indian market. For instance, Advance Valves has been manufacturing the triple offset butterfly valves for almost three decades and has a very expansive portfolio of installations. This has been the ideal option for hydrocarbon isolation, where today conventional valve manufacturers are also building their portfolio on this product, remarks Pranay Garg.

Advance Valves innovation has evolved to a formally structured research and development activity. Development cycle includes product validation including testing from 1960^{0}C to 6000^{0}C with pneumatic pressures going up to 600 bars, fugitive emission testing, performance cycling, flow analysis and testing, oxygen cleaning facilities etc. Therefore, the intensity through which our product is validated gets with the industry guidelines, standards and client specifications. This is one of the reasons, we have negligible reports of valve failure on site, He tells us, "Our major effort is toward meeting customer expectation because when you are going an engineered product, expectations are very high for quality and performance along with cost and delivery.

Looking after customers

Undoubtedly, one of the cornerstones to Advance Valves' success has been its focus on the needs of its customers. In its initial years the company concentrated on the Indian domestic air conditioning industry but thereafter it diversified its product range to enter into the oil & gas industry and other industrial sectors such as power, water, and petrochemicals, etc.

By the mid 1990s it had entered the international marketplace, providing products to the global flow control industries. For years now, the company is considered to be a value-added vendor to almost all the recognized oil companies around the globe. Supplies to LNG projects with cryogenic valves have been very regular for more than a decade across the world. As such it has a truly excellent track record for its products.

"Particularly important when working with our customers is that we ensure that we advise them on the correct application of our valves and do not just agree to what they say for the sake of this. The customer is always king but may not always be right and in this we have always found that honesty and forthrightness are the best policy towards establishing long-term relationships." Pranay articulates.

Quality a priority

Quality has always been an integral part of Advance Valves' philosophy. The company's dual plate check valves and metal-seated butterfly valves are further certified for fire-safe applications (BS 6755, ISO 10497) and cryogenic services (BS 6364). Pranay takes up the story, "We are committed to creating value for all our stakeholders in particular, and society in general, by engaging in distinct business areas related to design, manufacturing, supply and support of products and services globally. In order to achieve this, we ensure sustained deployment of emerging technologies in conformance with national and international standards. We will continue to monitor and improve the effectiveness of our quality management systems for our customers by providing them with total solutions in line with their stated and implied requirements. At the same time, we empower our employees at all levels in safe and conducive work environments and our suppliers are equipped with appropriate tools and technologies to meet the stringent quality requirements."

Product range

When it comes to products, Advance Valves particular specialty is in the manufacture of Dual Plate Check Valves (as per API 594/API 6D), and TOBVs and Soft-Seated Butterfly Valves (as per API 609) in metallurgies that are particularly suited for all petrochemical, sour, and seawater services, as well as for power & chemical, oxygen, desalination, fertilizers, LNG, mining, and oil & gas with their very demanding applications and extreme conditions of temperature, pressures, and corrosive atmospheres.

These products are offered in Aluminum bronze, duplex stainless steel, titanium, Hastelloy, alloy 20, and Inconel to name just some of the exotic metals used at Advance Valves. Additionally, the company's Balancing Valves are considered to be a de-facto standard in the Indian heating, ventilation, and air cooling (HVAC) sector. Other valves of special importance within its production lines are MOVs and On/Offs, Axial Flow Check Valves, and pressure independent control valves.

"Today," says Pranay "we hold multiple patents for our products and have launched the best-in-class Axial Flow Check Valve with the highest performance characteristics. Our butterfly valves are complemented with a fully equipped automation centre for all on-off throttling and control applications."

Global Market Coverage

It is not surprising that with this array of quality products Advance Valves has, over the years, built up a global coverage of renowned customers. Pranay adds "We work especially strongly with customers in the Americas, Europe, the Middle East, and India where we have, for example, used creative solutions to help customers move from conventional gate and ball valves to triple offset valves across a wide range of applications. At present this is being advanced even further in that Triple Offset Valves are being used for isolation & in control both with a number of our customers." Today the company can be regarded as being truly global, supplying to more than fifty countries. In this respect, the Advance team spans across diverse cultural backgrounds from as wide apart as the US and South Korea. Moreover, it is presently expanding its network by welcoming more partners globally, and within India, so that it can be even more effectively 'on the doorstep' of its customers and thus help and support them in the best possible way. This has meant that in India, for example, Advance Valves offices have been multiplying in a rapid expansion phase.

Company's global market coverage is also reflected in the significant number of approvals with major end-users. Especially noticeable is that this list goes on and on and reads like a who's who in industry.

Manufacturing infrastructure

In order to cater to its large number of customers, Advance Valves has set up a number of modern plants to accommodate both the Indian and international markets. It has a world class manufacturing facility in the Noida Special Economic Free Trade Zone, which is capable of producing goods to all international requirements, and deploys modern machining centres, large size material processing and handling equipment and has sophisticated quality and testing setups, which includes cryogenic test facilities as well as an oxygen cleaning setup. The company's major manufacturing base comprises four units spanning 20,000 m^2.

The base is further complemented by a global servicing infrastructure, representatives, and stocks for providing support to its customers. Additionally, all its castings (ferrous and non-ferrous) are procured from reputed, leading, technically sophisticated and well-established vendors in India, and under the leadership of Mr. Shanker, the company adheres to the motto 'Capability in-house, capacity outside.' It therefore maintains a strong network of specialist job workers to further enhance the scalability of its production capacity, to rapidly respond to project cycles.

"One thing is certain", comments Pranay "we are here to stay and will continue to look at long-term partnerships with our customers by providing them with solutions to their operating plants, whether these involve regular maintenance, upgrades, or start-to-finish developments. With our strong management and highly qualified staff we intend to keep our customers at the centre of our universe. We continue to make a big difference for them, now and in the future." ■

https://www.advancevalves.com/

A success story scripted with focus on turnkey solution & on-time delivery schedules

Dembla

K. N. Dembla
Chairman
Dembla Valves Ltd

Mukund N Katageri
Director
Dembla Valves Ltd

As Our Chairman K. N. Dembla a renowned technocrat and visionary with a goal to achieve the highest levels of perfection and excellence in the industry says, a "Memorable journeys are often motivated by the destination. Our business of valve designing & manufacturing stands on the principle of becoming the 'Customers Preferred Company' & to serve them with highest quality of products and global service support."

Dembla Valves started to take shape in 1985 and was established as a Valve manufacturing company in year 1989, by Hof an industrial company with a focus on core engineering, We all set a target for ourselves – to achieve the highest level of excellence in valve manufacturing, where we were not competing with anyone but our own selves. We all are inspired to improve ourselves and create a highly respectable repute and set a distinct benchmark in the industry

The company started its growth spree in its initial years under the stewardship of our Chairman K.N. Dembla, a technocrat with more than 5 decades of experience in valve designing and quality control. He was ably supported in this growth by his younger brother Jaiprakash N. Dembla, having over 4 decades of manufacturing experience in the valve industry and our Director Mukund N. Katageri having more than 30 Years' experience in Sales & Marketing of the valves in Various Industry segment and Supply Chain Management.

The 2nd generation Directors, Mr. Kapil Dembla and Mrs. Harsha Suvarna having more than a 15 years of experience in International Sales & Marketing & Valve Services in the industry are contributing to the journey ahead with a steady growth of the company.

We at Dembla Valves have a team of visionaries and technocrats who have been instrumental in taking us to the position that we today hold in the industry. We have a team of individuals whose persistent efforts help in fortifying our position in the industry.

Guided by proven management principles, Dembla scripted its own success story with a focus on turnkey solutions and on-time delivery schedules. Recognised internationally for these qualities, Dembla is marching ahead with an eye towards a bright future. The management is backed up by young team of talented professionals from all departments.

Dembla manufactures Control Valves Globe type in 2 Way, 3 Way, Right Angle, Double Seated, Motorised Actuated Valves, On-Off Valves, Shut Down Valves, ESD Valves, ROV's & POV's , Triple Offset & Double Offset Butterfly Valves, Trunion mounted, Floating Ball, DBB (Double Block & Bleed), Segmented V-Ball, and Gate, Globe & Check valves, catering to the Oil & Gas, Petrochemicals, Power, Fertilizers, Metal & Minerals like Steel & Aluminium, Chemicals, Pharmaceuticals , Agro based industry like Ethanol, Distillery, Pulp & Paper Industries and Sugar Industry, where the almost 55-60% of the revenue is generated from the Hydrocarbon industry from customers in India & abroad.

Dembla has risen to become one of the most trustworthy brand names in valve design and manufacturing. At present, We are manufacturing valves at our state-of-the-art manufacturing facility near Mumbai in Thane, India with a working area of 1,40,000 Sq. Ft. It is a world class manufacturing setup built & working on 'Lean Manufacturing Philosophy.' The entire setup is streamlined for a smooth production flow based on a 'pull' system. The infrastructure created for "all operation under single roof" has added to better coordination among all departments like design, development and manufacturing and QCD resulting in a sound engineered manufactured valves.

The company has a dedicated R & D centre for continuous technological up gradation in the designs of existing range of products and additional new products for complete turnkey solution to our valued customers as per the latest Standards of the Hydrocarbon industry.

The factory is equipped with modern hydraulic test benches separately sequenced for in house testing and customer / third party inspections. The factory has a very high-capacity mechanized painting shop to cater requirements of world class painting procedures.

We have a robust Material Identification system in place and are properly segregated with in-house PMI Testing, Ultrasonic Testing, Magnetic particle test, Hardness test and Dimension check is done on CMM machine in house.

We have Latest CNC Machines, Flat Bed VTL's & line up of precession Machines to carry out machining of various parts by translating the 3D and CAD files directly into manufacturing specifications with absolute precision and tolerances.

Our latest products on display comprises of the following valves:

1. Metal Seated Ball Valve with Rate 'A' leakage class having features:

a. It Deliver longer life, tight shut-off performance in numerous applications within the oil and gas, petrochemical and chemical industries.

b. Ensures Bi-directional sealing & High-Pressure Gas-tight sealing. It is achieved using Match-lapped balls and seats for bubble-tight performance.

2. Cryogenic Triple Offset Butterfly Valve, Globe Valve & Ball Valve having features:

a. Laminated and solid metal seat designs are available for Tight Shut – off (Class VI) leakage and Minimum extension length & height available is 700mm or larger. Height of the extended bonnet suitably designed for cryogenic temperatures

b. Right selections & testing of materials are basics for good performance of cryogenic valves. This is done meticulously for low temperature service suitable for -196°C.

3. Globe Control Valve for Severe Service having features:

a. High Pressure Anti Cavitation Trim design

b. Multi Cage Anti Cavitation Trim design

c. Low Noise Trims & Special designed Trims for Flashing Service

4. Globe Control Valves with Special PFA Lining suitable for Highly Corrosive & Hazardous Fluids

5. Double Block & Bleed Ball Valve having features

a. Double block and bleed valves are used for primary and secondary isolation where bleeding the valve's cavity is required. Double block and bleed as defined by API 6D is a "single valve with two seating surfaces that, in the closed position, provides a seal against pressure from both ends of the valve with a means of venting/ bleeding the cavity between the seating surfaces."

b. API 6D defines double isolation and bleed valves as a "single valve with two seating surfaces, each of which, in the closed position, provides a seal against pressure from a single source, with a means of venting/bleeding the cavity between the seating surfaces."

Apart from continual product development against the special requirements various non- conventional tests, POD tests, and Type tests conforming many international standards are routine activities at Dembla.

Testing under Cryogenic conditions, High Temperature condition, Low fugitive emission testing, TAT testing, PAT testing, Fire Safe testing, and Life cycle testing.

Dembla Valves is extremely careful when it comes to the safety and health of its employees and contractors. We keep safety standards at top priority and have ensured a zero-accident policy in our organization. The plant has global accreditations for Quality, Health & Safety and Environment Protection. This is an API approved facility authorized to use API-6D monogram for Ball & API-609 for Butterfly Valves

Dembla Valves are SIL-3 Compliant, and certification issued from Exida which is a renounced certifying authority worldwide.

We are PED Approved for CE marking for the valves intended for European Community (EC). The Valves manufactured are having ATEX required for installation in hazardous areas.

We are having EIL Certification & Approved in all major Hydrocarbon companies in India & Abroad like IOCL, HPCL, BPCL, GAIL, OIL, HMEL, MRPL, CPCL CAIRN, NTPC, BHEL & ADNOC, KNPC, KOC, Occidental many more.

Today, Dembla Valves is working in multiple process industries across India and many counties like Australia, Asia Pacific, Middle- east, Europe, Africa, North America South America and countries Germany, France, Japan, USA, Russia, Brazil, Mexico, Chile, Canada, Australia, Indonesia, Philippines, Vietnam, Austria, Africa, Spain, Turkey, Netherlands, Italy and more across the globe.

We are working with Many EPC's executing Turnkey Project for Hydrocarbon Industry Like L&T Hydrocarbon, Tecnimont, Petrofac Worldwide, Toyo Engineering, Worley, MODEC Singapore, SBM Offshore, Total Energy, VME Process – Malaysia, Wasco Engineering Services – Singapore/ U.A.E, Technip Energies – Worldwide, Daleel Petroleum Oman, Occidental of Oman, SABIC – Saudi Arabia, PT Tripatra & Tecton to name a few of them.

We shall continue our pursuit of excellence with the same zeal with which we embarked on this journey. ■

https://www.dembla.com/

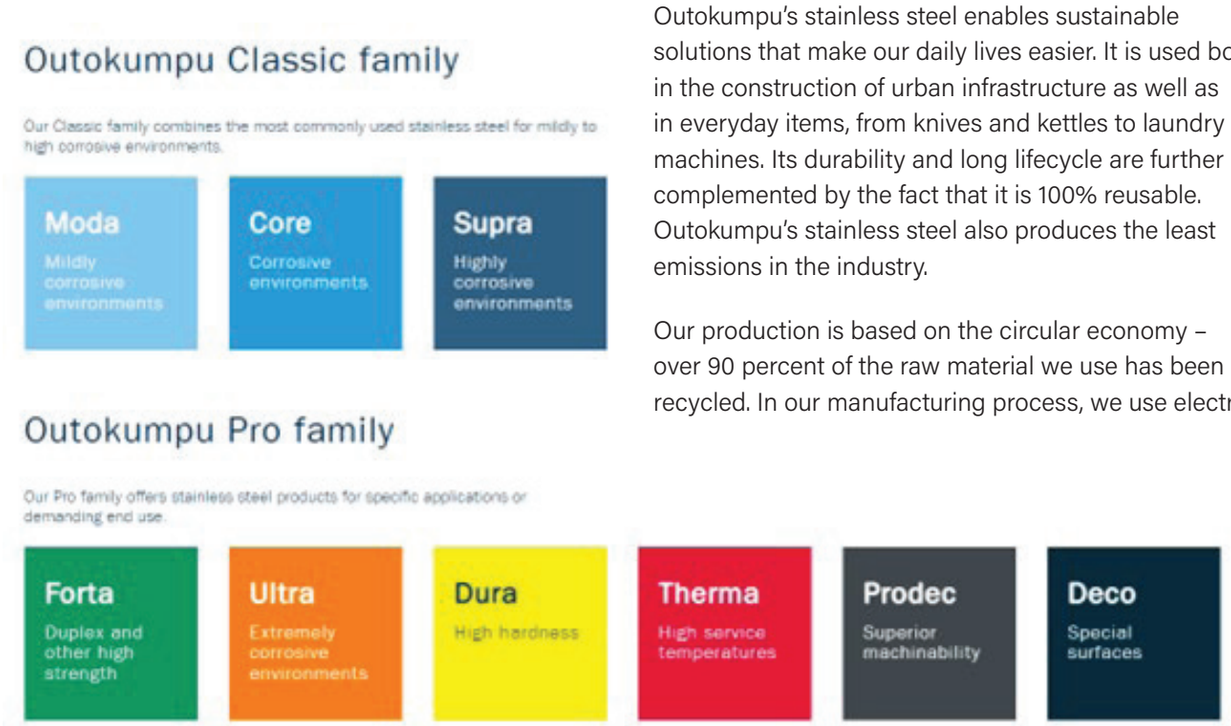
Emission-minimized stainless steel: Setting the new standard

outokumpu
working towards a world that lasts forever

Our stainless-steel products are at the heart of modern society and deliver benefits far into the future. Stainless steel is an ideal material to create lasting solutions in demanding applications. Its uses are endless. Thanks to its unique properties such as durability, low-maintenance and resistance to corrosion, stainless steel is not only the strongest, but also the most economically sustainable choice.

SS: Tailored for applications

Tailored to your needs, flat products are suitable for various industries from appliances and automotive to construction, heavy industry and beyond. Our flat product forms include coil, strip, precision strip, sheet, plate and quarto plate. Outokumpu's stainless steels can be divided into different categories which are ferritic, martensitic and PH grades, duplex and austenitic. The best steel depends on the application and together we can find the right one for every application



Latest grades: Nickel Alloy Ultra 825; Nickel Alloy Therma 800/800H/800HT; Ultra Sanicro®35; and many more

Outokumpu's legacy of innovation and consistent quality means that we have just the right product for every application. We offer several ranges based on performance to make choosing the best product for your application easier.

Low Carbon F ootprint

The sustainable choice - Outokumpu stainless steel has the lowest carbon footprint in the industry. Outokumpu's carbon footprint is 70% lower than the global industry average. We publish environmental product declarations (EPDs) on our main products using life cycle inventory data. This means our customers are able to calculate the sustainability performance of their product life cycles.

At Outokumpu we constantly research and develop new ways of operating to reduce the environmental impact of stainless steel and its production. Our growing environmental efficiency is based on long-term efforts and continuous improvement.

Outokumpu's stainless steel enables sustainable solutions that make our daily lives easier. It is used both in the construction of urban infrastructure as well as in everyday items, from knives and kettles to laundry machines. Its durability and long lifecycle are further complemented by the fact that it is 100% reusable. Outokumpu's stainless steel also produces the least emissions in the industry.

Our production is based on the circular economy – over 90 percent of the raw material we use has been recycled. In our manufacturing process, we use electric

arc technology to heat up and melt reused steel in order to minimize emissions. However, this also consumes a lot of electricity. For this reason, energy efficiency and constantly improving it have been a part of our everyday operations for years now.

From the start of November 2022, Outokumpu has been providing its customers with the specific carbon footprint for their products – and is the first stainless steel producer to offer this. Stainless steel and other corrosion resistant alloys are used widely in the oil and gas industry to ensure that assets are reliable, safe and long-lasting. Upstream, they are used as in pipelines, flowlines, control lines and downhole tubing and they're used downstream in refinery equipment such as heat exchangers.

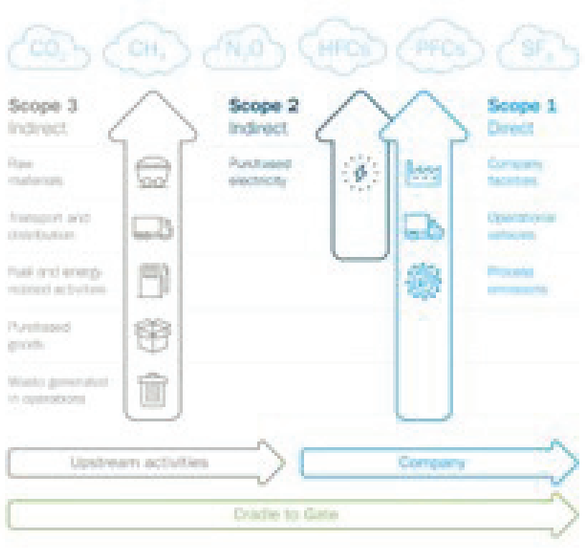
Quality, price and availability are always important commercial factors, but today's buyers also need carbon footprint data so that they can focus on measuring and improving environmental and sustainability performance. Interpreting carbon footprint can be challenging for the engineering, procurement and construction (EPC) contractors that oversee material specification. There is significant variation in carbon footprint of corrosion resistant alloys, depending on how the alloy is produced, the alloying content and the processing steps used.

And while kilograms of CO_2 emissions per kilogram of steel may seem comparable at first glance, it may be impossible to make a direct comparison between the carbon footprint data quoted by different companies. That is because different companies interpret the ISO14040 environmental management standard in different ways. For example, they may apply the product category rules (PCRs) differently – and that can lead to significant variation in the apparent carbon footprint.

The drive for product-specific data - Until now, the industry has always relied on average figures. Some buyers have simply used the European average footprint of 2.8 kg of CO_2 per kg of stainless steel, whereas Outokumpu has always quoted a significantly lower average, which was calculated across our entire portfolio. That is because we base our production on Electric Arc Furnace (EAF) technology that draws low-carbon electricity from nuclear and renewable sources. In addition, we minimize energy consumption by using an average of 90% recycled scrap content in our stainless steels.

However, we recognized that it's not enough to present an average figure to our buyers. There is growing demand for accurate figures that account for emissions under Scopes 1-3.

We are now able to meet this demand and have added product-specific carbon footprint data to the product certificates we supply to customers with their orders. Based on a rolling average, the new product-specific carbon footprint takes account of the energy we use in our steel melt and processing steps under Scopes 1 and 2, as well as the embedded CO_2 from upstream sourcing and processing of alloying elements and recycled scrap content under Scope 3. And buyers can have certainty in the data as our methodology has been verified by WSP, the engineering consultancy.



Accurate calculation of infrastructure's carbon footprint What this means for buyers in the oil and gas industry is transparency and accountability over the environmental impact of their alloys. Project engineers will be able to use the data to improve accuracy when calculating the carbon footprint of the infrastructure that they build using our material.

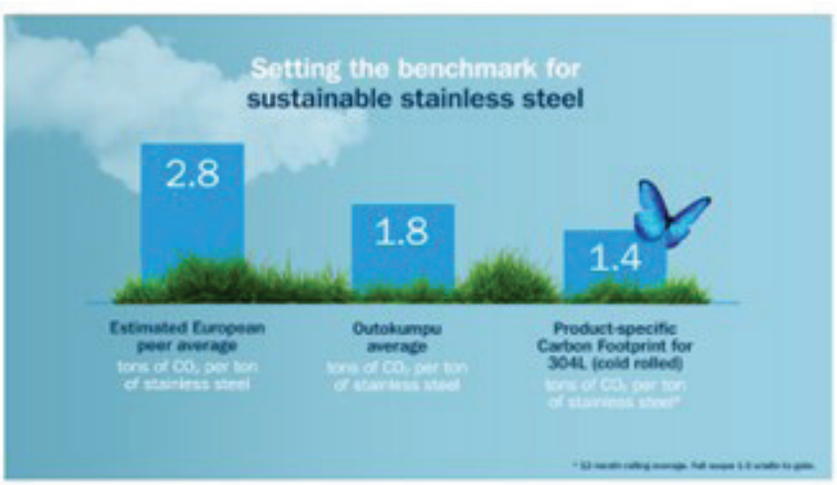
The duplex, super duplex and nickel alloy grades used in oil and gas contain higher levels of virgin materials to meet the high alloy composition. As a result, they tend to have a higher carbon footprint than a standard off-the-shelf grade like 304 or 316. In general, we can produce grade 304 without adding pure nickel and other elements and this helps to minimize carbon footprint in these cases. However, this approach is not possible when it comes to high-performance alloys.

Alloying

It's true that the alloying content tends to push the carbon footprint up compared with the basic grades. However, the single most important aspect of sustainability is building infrastructure that achieve the required specification. For example, building pipelines or heat exchangers that are safe, reliable and long-lasting.

In addition, we counterbalance the effect of the alloying elements by using a high ratio of scrap in our products and sourcing fossil-free energy at our production sites. This minimizes the carbon footprint of these high-performance alloys without greenwashing.

Ultimately, it is only through accurate data that the industry can truly demonstrate its drive towards sustainability. And by being the first in the industry to take this open book approach, our customers will benefit.



Green Transition

As the energy crisis in Europe continues, companies and consumers alike are forced to think of ways to save electricity and improve energy efficiency. Currently, Outokumpu is Finland's biggest user of electricity, so improving energy efficiency is naturally important to us.

Ambitious goals and projects guide development, the energy crisis in Europe has turned our operating environment on its head. In order to control the uncertainties, we decided in November to take immediate action to improve our energy efficiency. We made the decision to prioritize investments that improve energy efficiency and to increase capital expenditure related to improving energy efficiency by a total of EUR 40 million for 2023 and 2024.

By the end of 2024, our goal is to improve energy efficiency throughout the Group by 8 percent compared to the level of January–September 2022. This equals an energy saving of approximately 600,000 MWh, which corresponds to the electricity consumption of 15,000 households.

The first projects have now been approved, and they are expected to start in early 2023. The first millions of euros have already been invested in the projects, and the projects will yield an estimated energy saving of 42 GWh. This corresponds to 7 percent of the total savings goal.

The first approved projects are aimed at, among other things, improving the energy efficiency of industrial furnaces, developing the combustion process and replacing the existing technology with more energy-efficient models. There are also various ongoing projects serving continuous improvement that do not require large investments but can still lead to considerable energy savings.

We would have continued our ambitious work to improve energy efficiency even without an energy crisis in Europe, but the current situation gave us a push to expedite our schedule for reaching our goals. More stringent energy efficiency measures also support our ambitious climate goals: we are committed to science-based emission reduction targets in order to keep global warming below 1.5 degrees Celsius. Energy efficiency, competitiveness and emissions reduction go hand in hand. With each of our decisions, we aim to move one step closer to a more sustainable world.

Electrification aid supports sustainability and competitiveness - The situation in the energy market affects all of us in one way or another, and the measures that companies take have a considerable economic impact in the midst of the energy crisis. Companies and decision-makers play a key role in ensuring energy efficiency and in its effects on both emissions and

competitiveness. For example, through electrification, carbon leakage can be reduced, and it can be ensured that Outokumpu and other energy-intensive companies continue to have the capacity to invest in energy-efficient, low-carbon manufacturing processes also going forward.

Many EU countries have implemented electrification aid in accordance with the EU's recommendations. However, the current electrification aid in Finland only covers a fraction of the additional cost from emissions trading on electricity prices and is also several times smaller than the EU recommendation. Electrification aid is a central part of the emissions trading system, as it prevents carbon leakage into, for instance, Asian countries, where the emissions from the production of stainless steel may be five times greater than in Finnish production. Electrification aid in accordance with the EU's recommendations would ensure the reduction of global CO2 emissions, enable more sustainable investments and allow for the retention of industry-sector jobs in Finland.

Energy efficiency, competitiveness and emissions reduction go hand in hand. With each of our decisions, we aim to move one step closer to a more sustainable world.

New Standard for Sustainable SS

Emission-minimized stainless steel - The new standard for sustainable stainless steel is now set. We are introducing the Outokumpu Circle Green – stainless steel with 92% lower carbon footprint compared to the industry average. Outokumpu Circle Green – setting a new standard with 92% lower carbon footprint than the industry average

Outokumpu is shaping the stainless-steel market with its new emission-minimized product line, Circle Green. It has the smallest emission intensity in the world, with a 92% lower carbon footprint than the global average and 64% lower than Outokumpu's regular production – which is already the current sustainability leader in the industry. The new standard for sustainable stainless steel is now set. Outokumpu Circle Green, the emission-minimized stainless steel, answers the global need for more sustainable and long-lasting products that help to build a more sustainable future.

A global first with emission-minimized stainless-steel production - The production of the new Outokumpu Circle Green is the first of its kind, as no other stainless-steel manufacturer has been able to produce stainless steel with such low emission levels. The unprecedented emission reduction was achieved with improvements throughout the whole stainless steel production chain.

Reductions in upstream raw material emissions were key to this success as they contribute the majority of stainless steel's total carbon footprint. Meticulous production and quality optimization led to higher energy efficiency. Biogas, biodiesel, bio coke, and low-carbon electricity have been used in production to eliminate 95% of all scope 1 and 2 CO2 emissions. While these bio-based materials have all been tested previously in production, they were used together for the first time ever to produce Outokumpu Circle Green.

The first batch was produced in Tornio, Finland, and was delivered to one of our strategic customers, Fiskars Group, to use for cookware. In this first phase, we will concentrate our efforts to serve a few strategic customers, but we are already looking at ways to scale up the production. ■

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Website: www.outokumpu.com

LNG Bunkering: A Marine Fuel Pathway to Net Zero emissions

Saunak Rai
General Manager
FICS, FNIMS, FUELNG

All our lives have been impacted by climate change in some way or the other. Be it rising food prices, or droughts, floods, extreme hot or cold climate, forest fires or rise in sea levels. 100 years from now future generations will look at this time as an inflection point in history and would evaluate if all of us took the right decisions and the right actions towards sustenance of humanity on this earth. Not taking an action is simply not an option!

Globally, shipping has the least emission footprint over all different modes of transportation. International Maritime Organization (IMO) estimates that CO_2 emissions from shipping were equal to 2.2% of the global human-made emissions in 2012 and expects them to rise 50 to 250 percent by 2050, if no action is taken. IMO has set a Green House Gases (GHG) reduction strategy with goals to achieve a reduction in carbon intensity of 40% by 2030 compared to the 2008 level, and a reduction of 50% in total CO_2 emissions compared to 2008 by 2050.

IMO Mandates

IMO is rolling out mandatory goal-based technical and operational measures to reduce carbon intensity

of international shipping, like the Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Index (CII). EEXI will be applied retroactively to vessels above 400 GT falling under MARPOL Annex VI through a one-time certification, targeting design parameters. The CII measures how efficiently a ship transports goods or passengers and is given in grams of CO_2 emitted per cargo-carrying capacity and nautical mile. The ship is then given an annual rating ranging from A to E, whereby the rating thresholds will become increasingly stringent towards 2030.

One of the best ways to achieve IMO's above ambitions, and to reach the goal of reduction in GHG emission is for the ship owners and operators to choose alternate greener marine fuel for their vessels. There are four prominent fuel pathways for the ships to decarbonize and reach a net zero emission goal in the future.

Pathways

First is the Oil pathway, which is the most prevalent pathway today, utilizing HFO with scrubbers or LSHFO or MGO as present fuel and a pathway to NetZero emissions using Biofuels like Biodiesel. with the future fuel of biofuels this is a known pathway, conventional vessels mature technology and vast infrastructure there are however challenges with biofuels with regards to how long they can be stored in ships tanks because of the intrinsic nature, their adaptability to the engine technology, and also to the cost which is extremely high. One of the other concerns on large scale rollout of Biodiesel is that if we vastly increase the amount of acreage given to growing crops for biofuels production, we will cause a food shortage and resultant exponential increase in food prices.

The other is the LNG pathway. LNG provides immediate reduction in CO_2 emissions of about 23 to 28%, close to 100% reduction in Sulfur dioxide emissions and Particulate Matter emissions and about 75% reductions in Nitrogen Oxide emissions. In addition, through Liquid Biomethane and E-Methane or Synthetic Methane, LNG provides a pathway to net zero emissions. Advantages of this pathway is mature engine technology, immediate reduction in CO_2 emissions, widespread fuel availability, and the expanding bunkering infrastructure. Also, all this infrastructure can be leveraged for use of Bio Methane and E-methane. Challenges for this pathway is Methane slip and handling of cryogenic fuels.

The next is the Methanol pathway. The advantage of Methanol is that it results in immediate savings of up to 10% of CO_2 emissions, and it's a liquid at ambient temperature, so handling the fuel itself is relatively easy, bowth on the ship as well as ashore. The challenge with Methanol is of course that it is mildly toxic, and it requires almost 1.4 times more storage space onboard, compared to LNG. The future version of Methanol the Green Methanol is carbon neutral and is a zero-emission fuel, however it requires bio-carbon dioxide source or CO_2 captured by direct air capture.

The 4th or the final one is the Hydrogen pathway, with fuels like Hydrogen and Ammonia both part of this pathway. It is interesting to note that the most Ammonia available today is Grey Ammonia, which has an emission footprint even larger than fuel oil. So, changing to Grey Ammonia as marine fuel would create more emissions than solving the problem. The Green Ammonia is the carbon free version of this fuel; however, it's not presently manufactured in any worthwhile volume. The other big issue with Ammonia is that it is highly toxic. A study carried out by Det Norske Veritas (DNV) has shown that the toxic focus area spreads to almost 2.6 kilometers, when bunkering Ammonia at a rate of 1000 cubic meter per hour. This needs to be resolved before large scale adoption of Ammonia is attempted. The other challenges with Ammonia are its corrosivity, requiring special handling, it's a poor quality as fuel, needing a large amount of pilot fuel for combustion, and having low energy density requiring close to two times more storage space compared to LNG.

Hydrogen is one of the promising future fuels. The ability of Hydrogen to reduce emission impact depends on the way it is manufactured. Hydrogen manufactured from electrolysis using non-conventional power or Green Hydrogen is carbon free, nontoxic and has synergy with other sectors to be utilized as marine fuel. However, the challenges include immature technology for utilization on ship's engines, non-existent bunkering infrastructure and low-end energy density, needing close to 2.6 times more storage than LNG.

Conclusion

When we compare all the four above pathways, it is quite evident the LNG pathway provides a safe reliable, efficient, and progressive path towards net zero emissions. Presently about 35% of the ships on order (by Gross tonnage) are LNG fueled, heralding a big wave of LNG fueled ships in the market in the next few years. Also, the ever expanding it infrastructure today LNG as a bunk fuel is available in more than 50 ports of the world. ■

Facilitating safe and efficient berthing operations for large vessels

Andrew Stafford
Technical Director
Trelleborg Marine & Infrastructure

Optimal ship size is an ongoing concern in the shipping and port industries. There are major consequences associated with the deployment of larger vessels, from congestion in ports to extended port calls, leading to higher carbon dioxide emissions and potential incidents.

In 2022, the Supply Chains and Port Congestion report issued by the IMF (International Monetary Fund) in March noted that despite handling less cargo since mid-2021, many ports are experiencing longer wait times. The containership port congestion index created by UK broker Clarksons hit a new record on July 14, whereby 37.8% of the boxship fleet capacity was at port. This exceeds the previous peak level recorded in late October 2021 and stands well above the pre-covid average of 31.5% recorded between 2016 and 2019.

With ship berthing incidents becoming all too common at ports globally, the value of new technologies and digitalization is increasingly recognized by port operators, customs officials, and transport administrators. Technologies and digitalization are not just a means for enhancing efficiency, they also help to maintain business continuity in times of disruption. Optimizing port operations thus remains a fundamental mission for port authorities.

The berthing process relies heavily on human interaction, and numerous incidents have been attributed to this. Rope and wire mishaps cause 95% of personal injury incidents in the maritime industry, 60% of which occur during mooring operations, according to statistics from the European Harbour Masters' Committee. Larger tonnage and the subsequent "cascading" effect on smaller ports make the risk more prominent in such locations. .

Optimizing navigation and piloting systems

Even though marine vessels are larger than ever, much of the port infrastructure around the world remains unchanged. Therefore, navigating narrow passages and docking requires an even greater degree of precision. Establishing good communication between the pilot, master, and bridge personnel for the safe conduct of a ship in pilotage waters is crucial to the safe berthing of a vessel. In addition to having qualified and experienced masters and pilots, leveraging the right navigation and piloting solutions that capture and integrate data in real-time, both on-board and jetty-side, to improve communication, reduce delays and optimize vessel throughput is critical. Built in collaboration with marine pilots worldwide, Trelleborg's range of SafePilot solutions

addresses this. It provides port operators, pilots, and captains with accurate, real-time navigation information, giving pilots greater control, safety, and precision during port approach and maneuvers.

Moreover, with LNG floating storage and regasification units used more frequently in projects globally, situational awareness and highly accurate monitoring are fundamental to ensure that these operations are safe and efficient.

Introducing technology-enabled docking and mooring systems

As international maritime traffic grows along with vessel capacity, increased congestion within ports creates an environment where hydrodynamic suction and repulsion forces between passing vessels can occur, leading to moored vessels breaking lines, damaging wharves, and potentially causing serious accidents.

With the increase in vessel size, mooring lines and berth structures must deal with a greater amount of energy. Compromising a line to the point of breaking can significantly impact the port, increasing the risk of injuries and fatalities. A possible solution to this would be investing in more technology-enabled docking and mooring systems that can alleviate the pressure on traditional mooring equipment and, as a result, reduce risks and unplanned downtime.

For instance, DynaMoor, a safety focused dynamic mooring solution from Trelleborg actively maintains constant tension in mooring lines to dampen vessel movements, decreasing the effect that passing ships and long-period waves have on moored vessels. This means DynaMoor can increase port and terminal throughput by allowing operations to continue in a wider range of conditions while improving safety and reducing operational costs.

In contrast to traditional line mooring, which can take as much as an hour to set up at some facilities, automated mooring systems can secure vessels in less than a minute and release them for departure in just 30 seconds. This system enhances berth efficiency while reducing infrastructure and operational costs.

Automated mooring systems minimize safety risks through remote operation, removing the need for a mooring crew with rope-free and hands-free mooring.

Trelleborg's rope-free system, AutoMoor, provides highly precise and predictable mooring performance based

on the mooring analysis conducted for each vessel and berth combination. Using vacuum technology to rapidly attach to and secure a vessel at berth, AutoMoor reduces vessel motions and continuously monitors all mooring loads acting on the vessel at berth. This provides live data to the operator to optimize day-to-day port and terminal operations. It also minimizes personnel involvement to reduce human error and improve safety.

AutoMoor also helps ports and terminals become more environmentally efficient. Vessels secured in less than a minute and released in 30 seconds, reduces vessel idle time, and allows them to switch to shore power sooner. Additionally, the system reduces the amount of time tugboats stand alongside a vessel waiting for the mooring operation to complete, cutting overall emissions.

Ensuring the safety of vessels whilst at a berth is critical. The use of Ship to Shore Safety Links at these berths is not only good practice but is a legal requirement in some situations. Depending on the cargo from LNG to crude oil, Trelleborg has a range of oil and gas shutdown link technologies to ensure not only cargo safety, but in some applications the ability to transmit shore based Quick Release Hooks (QRH) tension data to the vessel, allowing the vessel to actively manage its rope tensions.

Design and selection of fender systems to prevent structural or vessel damage

To accommodate vessels of larger sizes, investing significant resources into rebuilding and upgrading existing facilities becomes an obvious next step for terminal operators. Future-proofing port infrastructure to increase safety, improve efficiency and sustainability, often involves installing high-quality fender systems to optimize vessel throughput and port operations over the long term.

Fender systems at ports must also balance the berthing needs of a wide range of vessels with different hull configurations – such as maximum allowable hull pressure, different hull angles, freeboard variations, and flat hull to belted hull.

This essentially means that designing the right fender system is important to facilitate safe and efficient berthing. Many factors contribute to the design of a fender system, changes in shapes and increasing vessel sizes included. In order to be effective, a fender system must withstand the impact of current ships and those expected to arrive in the foreseeable future. Other factors considered during the design process include the berthing structure, vessel approach, installation, and maintenance. In other words, taking a whole system approach to fender system design is crucial.

Four key elements need consideration while following this comprehensive approach – high level of technical expertise and application engineering, detailed fender system design, adhering to relevant manufacturing standards and quality control, making sure of proper fender system installation as well as ensuring that tailored inspection and maintenance programs are in place.

Selecting a fender system that lasts longer and requires less maintenance will prove to be a better long-term investment choice, as well as choosing the best investment for the environment.

Conclusion

Automation and the adoption of newer technologies will prove valuable in helping address the increasing number of challenges the marine industry is facing. By integrating assets such as fenders, mooring equipment, ship performance monitoring, and navigation systems through a network of sensors connecting port operations, port operators can analyze performance and use data to improve their decision making.

SmartPort by Trelleborg collects, stores, analyzes, and transmits real-time data, distributing it to the right people at the right time – whether they are on board the vessel, in the control room, or on the jetty. It powers the critical interface between ship and port, on land at sea, enabling technology-driven insight to increase operational efficiency, improve safety and enhance sustainability.

In addition to all these factors, it is equally important that all stakeholders, including those on board the ship, at the port, and at the terminal, work cohesively to maintain safe working conditions for their employees, assets, and the environment. ■

"Thank you very much for organizing this interesting and useful Conference of Oil Gas & Power World Expo 2023. Special Thanks to Jasubhai staff for a great support for this excellent conference and the possibility to attend. It was a very good and interesting topics presented in the conference indeed and thank you very much for the opportunity to take part in the Conference. Looking forward for future similar opportunities."

Abdo Ahmad
HOD for Drilling & Completions, Reliance Industries Ltd

"Congratulations to the Chemtech Foundation for successful organization of Oil and Gas Expo 2023 from 1st to 3 rd March. The event offered a wide spectrum of new technologies to delegates, exhibitors and key decision makers of Oil and Gas Industry. It was an excellent platform for strategic networking and key alliances. The engaging conference sessions provided deep insights to the various energy transition scenarios and adaptive integration of technology with renewables. It was an honour and pleasure to speak at the conference."

Ajay Dashore
Deputy CEO, Indian Strategic Petroleum Resources Ltd

"I'd like to take this opportunity to thank you for inviting me as a Speaker for Oil & Gas conference 2023, The session was very well structured in terms of content and logistics. The topics, diversity of the conversation, speakers, and amount of time were all well-balanced. Moreover, the session provides the change to connect with domain experts from a broad range of industries. Overall, it was a wonderful and pleasant experience. I'm excited to see you in upcoming session."

A Senthil Ram
General Manager T&D, Tata Consulting Engineers Ltd

"The Oil Gas & Power World Expo 2023 was a huge success with a wide range of exhibitors, speakers, delegates and visitors. As the leading event for the oil, gas and power industries in Mumbai, it offered a unique platform for meaningful dialogue and deliberations through concurrent conferences and exhibition. I enjoyed participating in an energetic and insightful panel discussion on the role of gas in the energy transition."

Vinod Tahiliani
CEO, India Gas Solutions

"It was great to participate in the conference on Gas Based Economy for Growth & Sustainability at the very successful Oil Gas & Power World Expo 2023.The event saw relevant conversations on the need to progress these emerging technologies to aid the energy transition. I particularly enjoyed interacting with students under the Student Outreach Program to share with them the exciting opportunities this sector will continue to have for them in the future."

Molyama Kromah
VP Technical Functions, BP India

"We thank you for inviting us as a speaker for the conference in Mumbai. My colleague, Sanjay Katrekar had also joined to participate and visit the exhibition. It was great experience being at the conference. The audience in the sessions was very engaged on the subject. We had a great experience in connecting with the Industry participants under one roof. We would like to thank you and Chemtech foundation for giving us this opportunity."

Sangeet Jain
Director, Lanzatech

"Thank you for providing a great platform for the Oil & Gas industry to come together and brainstorm on how the industry can play a critical role in energy self-sufficiency as well as helping in the energy transition to renewables and eventually a net zero environment."

Girish Shirodkar
Partner, Startegy&, part of the PWC Network, PWC

"Compliments to the team for successfully organising Gas World Tech conference 2023 on 2nd March 2023 in Mumbai. It provided great insight into emerging trends in the natural gas industry and also showcased the opportunities for investments in infrastructure sector to meet the growing need for natural gas. All the sessions were engrossing and interesting. I am sure the presentations and panel discussions were an excellent opportunity for all participants for sharing the knowledge and latest developments in the industry as well a learning experience. "

Mahesh Shedbal
Vice President - Customer and Contract management
Pipeline Infrastructure Ltd

OIL AND NATURAL GAS CORPORATION (ONGC)

GAIL (INDIA) LIMITED

DEMBLA VALVES LIMITED

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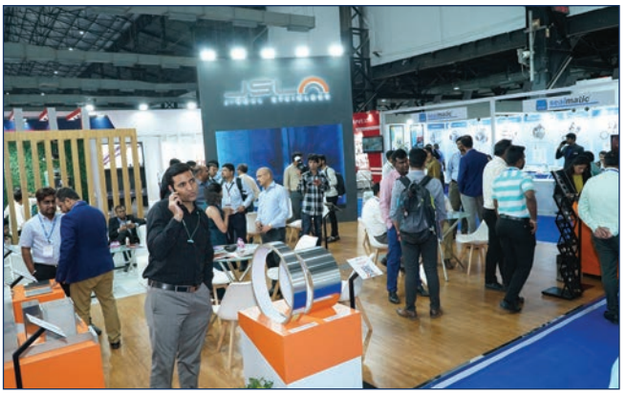

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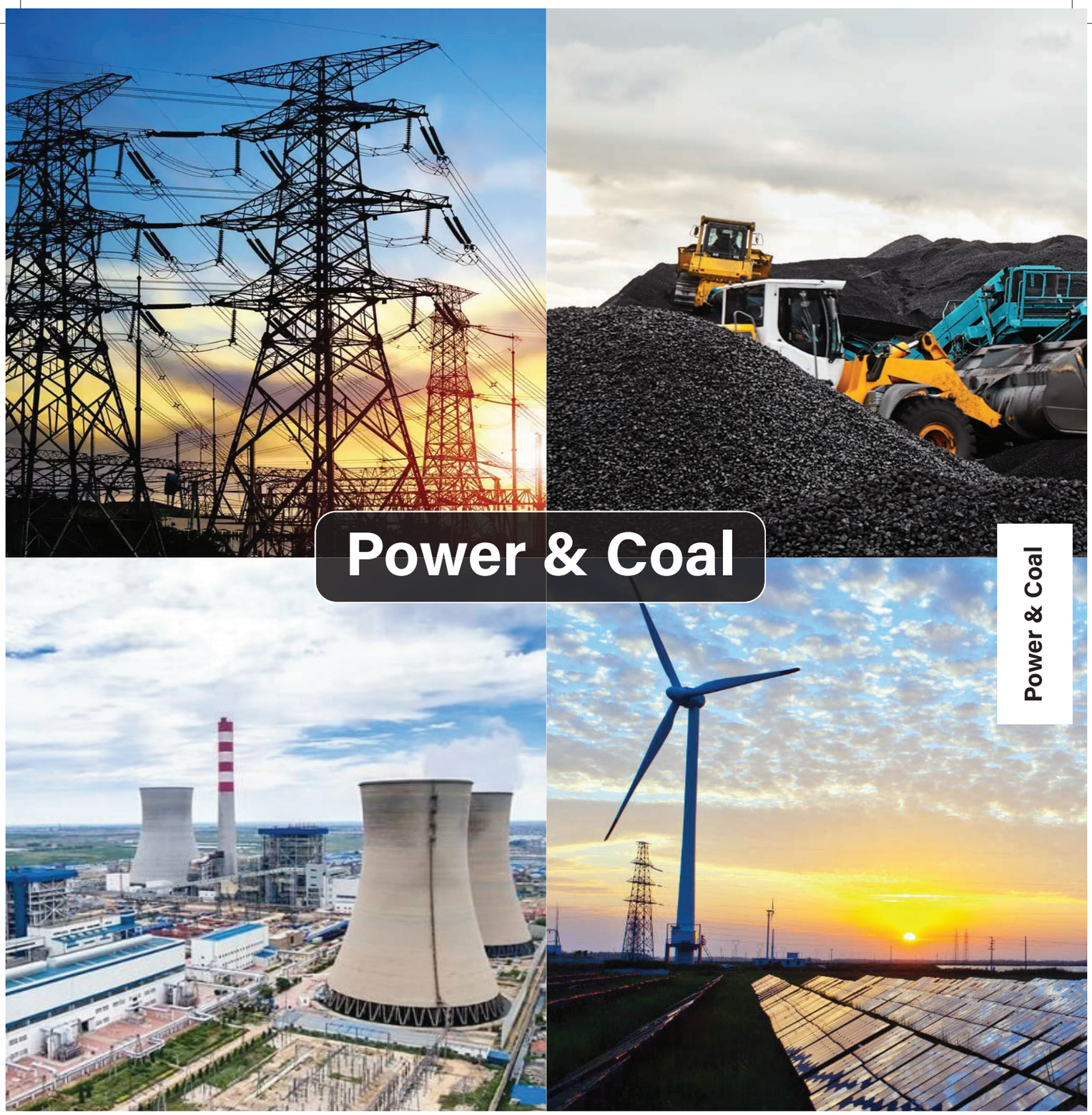


Power & Coal

Power & Coal

POWER World Expo 2025 + COAL World Expo 2025

March 2025, Mumbai, India

www.chemtech-online.com

Sustainable Energy Transformation For Economic Growth

(L to R) : A K Jha , Former CMD, NTPC Ltd ; Hemant Shetty, CEO, Chemtech Foundation & Jasubhai Media Pvt Ltd; Renuka Gera, Director (Industrial Systems & Products), BHEL; U K Bhattacharya, Director Projects, NTPC Ltd & Seethapathy Chander, Former Deputy Director General, Asian Development Bank

U K Bhattacharya
Director Projects, NTPC Ltd,
Chairman CAB
Power & Coal World Expo 2023

"We planned the Power & Coal World Expo 2023 conference with the theme "Sustainable Energy Transformation for Economic Growth" which is very much apt in the present context. The objective was to bring some of the best minds together from the global energy sector. It was a great learning forum with opportunity to hear the views of distinguished and agile personalities like Dr Anil Kakodkar, renowned nuclear scientist, Mr Arshad Mansoor, President & CEO, EPRI, Mr. John McKiernan, Head of Innovation Pipeline, ESB Ireland, Mr Seethapathy Chander, former Deputy Director General, Asian Development Bank, Mr A K Jha, former CMD, NTPC Ltd. and many other subject matter experts. Besides the conference, I was deeply impressed with the robust display of latest technologies in the exhibition and the student outreach program. I congratulate Chemtech for entering the 50th year of service to the industry and wish them the best to continue the legacy in the years to come."

Dr Anil Kakodkar
Chancellor
Homi Bhabha National Institute

"To scale-up renewables & keep them economic at the same time a combination of centralized and decentralized approach has to be developed as deploying a central grid in every part of a vast nation like ours would take decades & huge financial resources. Instead, a decentralized power supply in rural parts can help us make renewable power for all while keeping it economic and RTC availability for every one of us and simultaneously keeping us on track for achieving 2070 goals."

POWER + COAL
World Expo 2023

Chief Guest , Dr Anil Kakodkar, Chancellor , HBNI addressing the august gathering virtually during the inauguration of Power & Coal World Expo 2023

A K Jha
Former CMD
NTPC Ltd

एनटीपीसी NTPC

"The Power &Coal World Expo 2023 held on 1st and 2nd March 2023 at Mumbai was a great success. The theme of the Expo 'Sustainable Energy Transformation for Economic Growth' was very apt looking at the India's reliance on coal to meet its power demand and at the same time to meet its commitment to add 500GW of Renewable Capacity by 2030. The interaction with students of various engineering colleges was very stimulating experience. The Exhibition stalls of GE, L&T Power and NTPC was highlight of the exhibition. The Chemtech Foundation is entering the 50th Year of its establishment and I hope that the Power World Expo will go from strength to strength and will prove to be a beacon light for Power sector in the present era of energy transition. My best wishes to all future endeavours"

Renuka Gera
Director (IS & P)
BHEL

Prashant Jain
Managing Director
GE Power India Ltd

बी एच ई एल BHEL

"As climate change has become the key global concern, adoption of clean & environmentally friendly technologies is taking the centre-stage. In India we are committed to get Net- Zero by 2070, although while moving towards this goal we have to see simultaneously economic goal & environmental sustainability go hand-in-hand & there can never be a trade-off between the two."

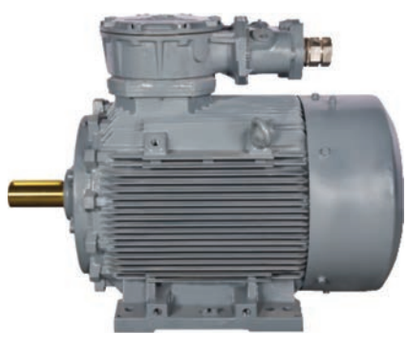
"I along with my team had a productive and inspiring time this year at the Power World Expo and Conference. The event provided a great platform for us to interact with many of our customers, discussing our advance technology and services offerings to support their power plants with enhanced reliability, efficiency and availability. Congratulations to Chemtech for 50 years of services."

A Motor for Every Need

Bharat Bijlee

Established in 1946, Bharat Bijlee has a complete portfolio of motors which are suitable for all applications across various sectors. Our robust & reliable range is suited for extremely harsh & severe applications also. With ability to manufacture application-specific customized motors, we are also approved with all major consultants & approval bodies in the country.

Industrial sector consumes the largest share i.e., 41% of the country's energy and here motors is the highest contributor. Need of the hour is to save energy and Bharat Bijlee has successfully developed motors in energy efficient series for each motor category. We now offer IE3 efficiency series for Safe area, Flame Proof Ex 'd', Increased Safety Ex 'ec', Crane Duty & Brake motors. Here if an industry opts for 25 motors of 22 kW / 4 Pole / IE3 instead of IE2, it can save over Rs. 60 lacs in a span of 20 years. Extrapolating this to an entire plant which uses many more motors across various kW ratings, users can realise savings worth crores of rupees.



Payback & energy saving calculation table

We take great pride in sharing that we have indigenously developed super premium efficiency IE4 & IE5 series motors. For this, CII gave its recognition as the "Most Innovative Energy Saving Product" in 2016 for IE4 & in 2018 for IE5 series motors. ■

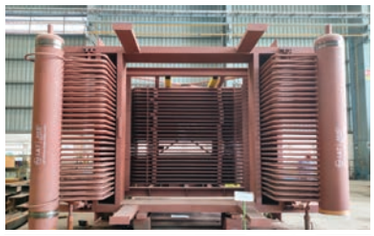
Website: https://www.bharatbijlee.com/

Aspect	IE3	IE2	IE3	IE2
Motor	2.2 kW / 4 Pole		22 kW / 4 Pole	
Purchase Cost of Motor (INR)	16,250	14,990	96,620	93,120
Motor Efficiency	86.70%	84.30%	93.00%	91.60%
Per Hour kW Consumption	2.54	2.61	23.66	24.02
Annual running Hours: 300 Days X 16 Hrs	4,800	4,800	4,800	4,800
Power Consumption/Annum (kW)	12,180	12,527	1,13,548	1,15,284
Average energy cost (INR/kWH)	7	7	7	7
Average energy cost /annum	85,260	87,687	7,94,839	8,06,987
Annual Saving when IE3 motor is used	2,427		12,148	
Motor Cost Differential	1,260		3,500	
Payback Period for differential amount (Months)	***6***		***3***	
Saving Over 20-year Life (INR)	48,546		2,42,964	
Total Saving for 25 motors (INR)	***12,13,659***		***60,74,095***	

With change in respective figures, energy saving & payback can be calculated for any rating.

Comprehensive Solutions for Steam Generation in Power Plants

NTPC Tanda 2x660 MW



L&T - MHI Power Boilers Private Limited (LMB) – a JV founded in 2007 – combines the capabilities of the two giants, Larsen & Toubro of India and Mitsubishi Heavy Industries of Japan, in the engineering, construction and manufacturing space.

LMB caters to large-capacity power plants with supercritical and ultra-supercritical boilers, including coal pulverisers, on a turnkey basis from concept to commissioning, as well as after-sales spares & services.

Unique features of LMB boilers include:

- Vertical furnace water walls
- Circular firing arrangement
- Advanced materials for high-temperature applications
- Higher plant efficiency
- High-efficiency pulverisers
- Low NOx burners

LMB also offers Selective Catalytic Reduction (SCR) system to comply with the latest emission standards. LMB has a state-of-the-art manufacturing facility for pressure parts, pulverisers and steel castings. LMB has supplied more than 200,000 MT of pressure parts, 200 pulverisers and about 5000 MT of steel castings for both domestic and international markets. Fifteen LMB-supplied boilers have successfully achieved commercial operation. Indonesia, Japan, Philippines, Saudi Arabia and Brazil are the major international markets for LMB's export orders.

LMB also provides sustainable solutions for emission reduction and decarbonisation of energy through Performance Improvement, Combustion Modification, Flexibilisation and Biomass Co-firing in coal based Steam Generators.

LMB, a qualified Indian Steam Generator Manufacturer (ISGM), is proud to play a major role in augmenting India's power-production capacity.

CBMC/082022

L&T - MHI Power Boilers Private Limited
Larsen & Toubro Limited, L&T House
N. M. Marg, Ballard Estate, Mumbai-400001
CIN:U29119MH2006PTC165102
www.Lntmhipower.com

L&T | MHI POWER

L&T-MHI Power Boilers Private Limited

Power Management and Quality Improvement Solutions for Complete Value Chain

C&S Electric Ltd. is one of the leading manufacturer of electrical and electronic equipment in India. It is one of India's largest exporter of industrial switchgear & power busbar products. C&S Electric products are used in applications ranging from power generation, transmission and distribution, protection and final consumption.

C&S Electric has the following main product verticals:

- **LVSwitchgear**
- **LV Switchboards**
- **LV & MV Busducts**
- **LV Bustrunking 7 Protection and Measurement Devices.** ■

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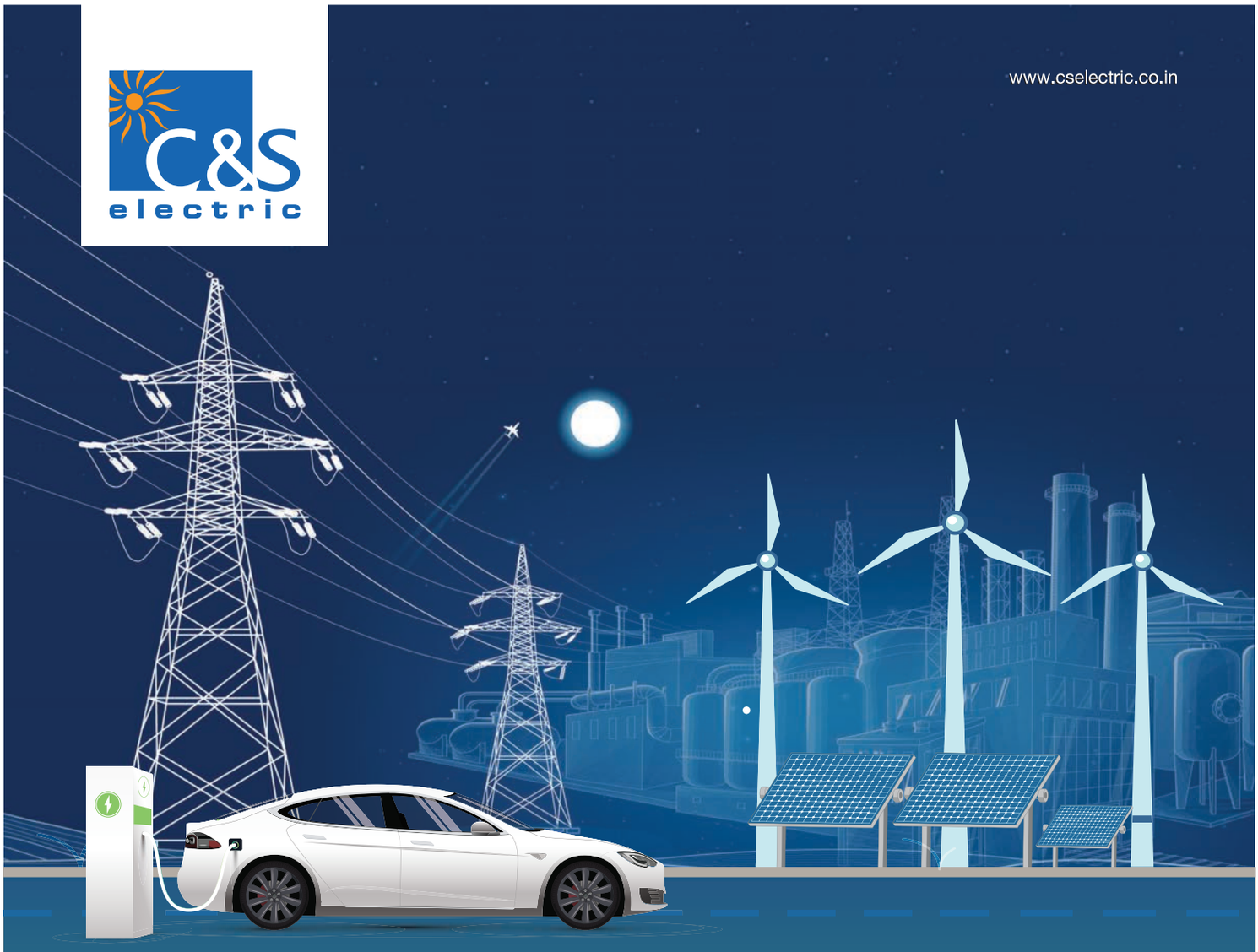


C&S Electric:
A Trusted Partner for
Power Management and Power Quality Improvement Solutions
For Power Value Chain

Thank You for visiting us @

Oil Gas & Power World Expo 2023

Our Product Range

LV Switchgear

LV Switchboards

LV & MV Busducts

LV Bustrunking

Protection & Measurement Devices

C&S Electric Limited

Registered office: 210, 211 & 212, Second Floor, 'Salcon Aurum' Building, Plot No. 4, Jasola District Centre, New Delhi-110025, **Email:** info@cselectric.co.in, **Website:** www.cselectric.co.in

We touch your electricity everyday!

Keeping the Lights On: Preventing Disruption through the IT/OT Convergence

OPSWAT.

The world of cybersecurity is rapidly changing—especially when it comes to keeping the complex networks in critical sectors safe around the globe. One of the major factors driving this change is that IT and OT are converging; cybersecurity professionals are being asked to wear many hats and this convergence exposes vulnerabilities that threaten to disrupt our modern way of life. These opening vulnerabilities make industries in critical sectors advantageous targets and those in the energy and power industries are being ever more targeted by bad actors.

As was evident in the cyberattack on the Colonial Pipeline in 2021, while the ransomware came through on the IT side, without a defense-in-depth solution in place, caused disruption on the OT side as well simply

because they did not know how deep the attack ran. It is more important than ever that, as cyberattacks become more sophisticated and obfuscated, that companies in these key critical sectors place a greater emphasis on advancing their cybersecurity maturation.

Zero trust at the Point of Entry

Updating PLCs, securing engineering stations against the threats of common malware, and ensuring that every piece of removeable media interacting with the endpoints on your network is a pivotal first step in bolstering your cybersecurity posture. We know that not every environment can benefit from a large piece of hardware to perform this check—nor is every environment friendly to costly and stationary hardware. That's where the new, ruggedized OPSWAT MetaDefender Mobile Kiosk is designed to enforce zero trust, even at below zero.

Employing our industry-trusted technologies like Deep Content Disarm and Reconstruction (Deep CDR), Multi-scanning with more than 30 anti-malware engines, and country of origin check, file vulnerability assessment, and data loss prevention (DLP), and outfitted with rugged-friendly features like a glove-ready touchscreen and operating extreme temperatures, Mobile Kiosk goes wherever you need it to make sure you're protected against the threats of removeable media.

This technology is more relevant than ever for those in the fossil fuel industry, as oil rigs have increasingly complex control systems in environments that are collecting and analyzing more data than ever. As these systems include more technology and hold more data, they become a more appealing target for cyberattacks. If your security team is under pressure to install a software update on an offshore oil rig in the middle of the ocean, how difficult is it to test your portable media to ensure you are not introducing any malware or vulnerabilities into the closed system?

Chances are that both the portable media containing software updates and the tools needed to test them will be exposed to cold ocean spray, heat, sun, and wind. Steep, slippery steps and catwalks mean that your portable media testing tool must be able to withstand those environmental conditions and still securely and efficiently inspect all media for vulnerabilities, malware, and sensitive data.

You can't protect what you can't see

Your network comprises devices of various ages, makes, and connection types – all running an equally diverse array of software and firmware versions. Keeping the IT/OT convergence in mind, this means that in order to best keep track of this complex inventory—and monitor for anomalies—your asset management solution should be smart, user-friendly, and easy to deploy.

OPSWAT Neuralyzer

Designed with the OT operator in mind, Neuralyzer is a machine-learning asset and inventory management and monitoring solution all presented in a single pane of glass, HMI-style interface. Out of the box and installed in minutes, Neuralyzer begins mapping your network, learning how the devices on it communicate with each other, taking inventory of key data such as make, model,

country of origin, firmware version, and software version, giving each device a threat score.

When an anomaly is detected, it's presented in a clear and actionable way so that the operator can respond promptly. With this complete comprehensive feature set, not only does this make managing your OT assets easier, but it also supports global, regional, and industry regulatory requirements for OT cybersecurity such as NERC CIP, NIST, NIS Directive, NEI 8-09, ISA/IEC 62443.

What does the future hold?

Even as organizations shift their focus to strengthen their cybersecurity posture, bad actors will not let up; they will continue to seek out vulnerabilities and exploit them. Integrating and deploying a multi-layered approach, with checks and stopgaps deployed from the executive c-suite down to the plant floor will continue to be crucial in protecting your business continuity, the safety of your employees, and the well-being of the communities you serve.

Additionally, government regulations will continue to be drafted and enforced to pressure organizations to take these threats seriously; potentially yielding costly fines to those who are non-compliant.

The growing skills gap as a result of the IT/OT convergence will require attention as even the strongest cybersecurity solutions are rendered ineffective without an adequately trained workforce. Whether it's something as straightforward as understanding the pitfalls of phishing schemes or gaining a better understanding of how core cybersecurity technologies work, closing the ever-growing skills gap can be facilitated with a training strategy that's affordable, frequently updated, and designed by industry professionals and experts.

With this particular challenge in mind, we developed OPSWAT Academy. Our academy offers self-paced training available practically anywhere at any time, designed to translate critical infrastructure protection (CIP) cybersecurity knowledge into real-world applicable skills and certifications to prepare tomorrow's protectors, today.

Adopting a Defense-in-Depth Strategy

As you can see, there is a lot to consider when it comes to advancing your cybersecurity maturity, and it's not something that happens overnight. It takes assessments, planning, and ultimately, expertise. Whether it's implementing the right solution for your organization's network, protecting mission-critical devices on the plant floor, monitoring your environment and responding to attacks, or training your workforce on the latest cybersecurity best-practices, partnering with a trusted and proven provider can help you get the most out of your solution. OPSWAT's MetaDefender Kiosks for portable media security and Neuralyzer for asset visibility are a great start to your cybersecurity journey and can be paired seamlessly with our other suite of IT/OT solutions – from secure file storage and unidirectional gateways to endpoint protection and much more.

OPSWAT at Oil Gas & Power World Expo 2023

OPSWAT, a global leader in CIP cybersecurity, is continuing to expand in the APAC markets with over a dozen customers in India since its operational expansion. The team will be at the Chemtech 2023 Oil Gas & Power World Expo March 1-3 in Mumbai, India. The event will bring together stakeholders from the energy industry ecosystem across the hydrocarbon sector along with power generation, transmission, and distribution industries to explore business opportunities. Networking at the conference will enable the professionals to engage in knowledge sharing sessions to share and learn from their peers' experiences.

About OPSWAT

OPSWAT is a global leader in IT, OT and ICS critical infrastructure cybersecurity solutions and Deep Content Disarm and Reconstruction (CDR), protecting the world's mission-critical organizations from malware and zero-day attacks. To minimize the risk of compromise, OPSWAT Critical Infrastructure Protection solutions safeguard both public and private sector organizations with the latest technology, processes, and hardware scanning to secure the transfer of data, files, and device access across critical networks. More than 1,500 organizations worldwide spanning Financial Services, Defense, Manufacturing, Energy, Aerospace, and Transportation Systems trust OPSWAT to secure their files and devices; ensure compliance with industry and government-driven policies and regulations, and protect their reputation, finances, employees, and customers from cyber-driven disruption. ■

Website: www.opswat.com

AT&C loss reduction and revenue enhancement of Distribution Utilities using AI & ML solution

Shashwat Joshi
Founder, CEO
SJTech Solutions

India is expected to reach an installed capacity of about 500GW by 2025. On the other hand, as per PFC's Report on performance of Power Utilities 2020-21, in 2020-21 alone ~183.25 Giga Unit Energy was not billed but supplied in India which would amount to approx. USD 20 billion. This is a classic case of dilemma where with increased capacity and energy demand, more power will be distributed but with high AT&C losses, Electrical Distribution Utilities' losses will only grow exponentially until billing efficiency is improved.

India's commitment to provide reliable, high-quality, 24 x 7 grid power supply to all willing customers has also intensified problems for many Distribution Utilities as they lose money for every unit of energy supplied. Improving electricity supply hours will only increase their total loss.

The following flow chart explains ideal money flow of Distribution Utilities:

Ideally, this money flow should yield DISCOM (Distribution Company) profits as Tariff takes all above factors into play. In spite of tariff hike periodically, DISCOMs incur losses. Why?

The two major factors that standout are:

- Billing in-efficiency (Irregularities/theft)
- Collection in-efficiency (Bill arrears)

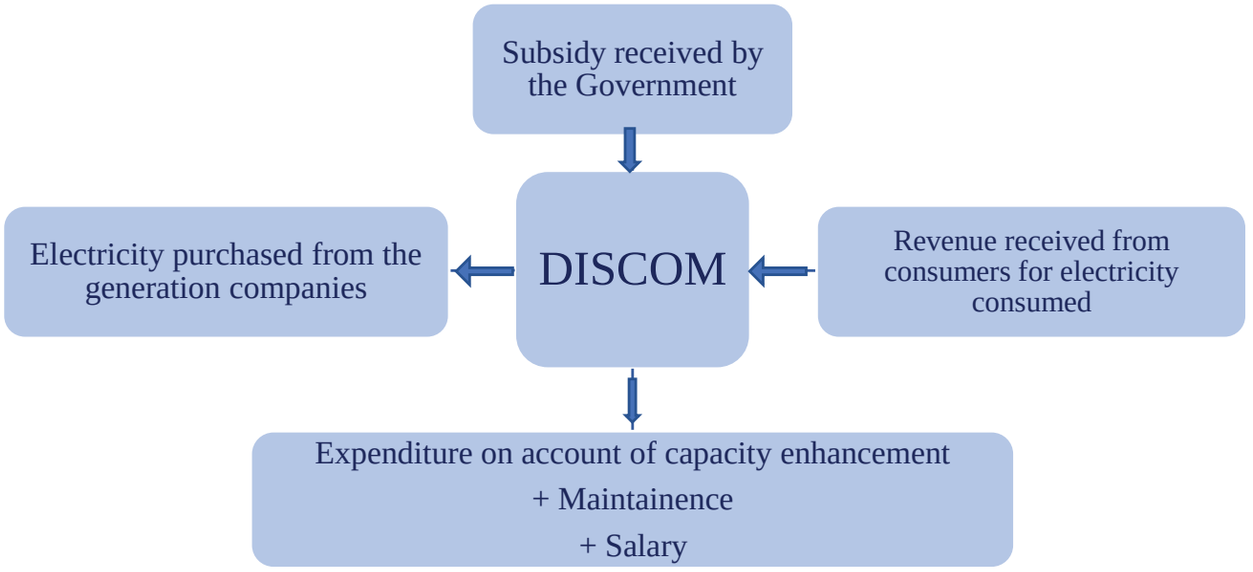
Smart meters are being deployed throughout the globe in hopes of reducing Distribution losses of Utilities. Smart meters will primarily aid in retrieving authentic data directly from meter without human intervention and increasing the in-flow of essential meter data in 15- or 30-minute intervals instead of one interval per month. This will reduce loss of billing due to incorrect meter reading. Irregularities like unauthorised use, incorrect usage purpose and theft will still prevail.

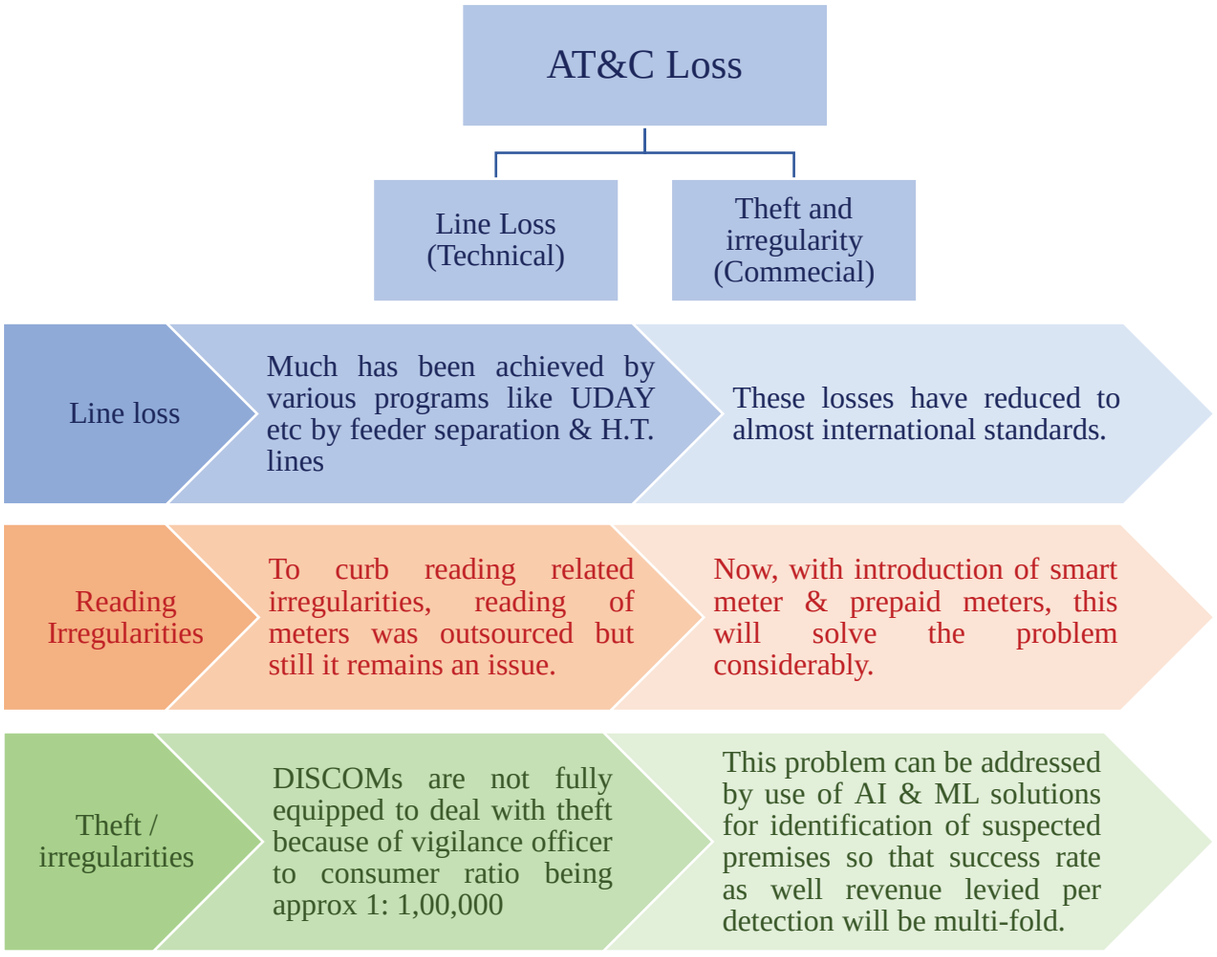
The best way to identify, detect and regularise these irregularities will be to process meter data using Artificial Intelligence & Machine Learning solutions to identify suspected irregularities without which strike/success rate of checking is very low. Manual analysis of billions of data records of millions of meters of a DISCOM is simply not possible. Smart meters will generate almost 3000 times the amount of data generated by regular digital meters in the same period. When most DISCOMs are currently unable to process entire monthly regular digital meter data, processing smart meter data will simply prove impossible and only lead to e-garbage.

Data Analytics solutions won't be as effective due to being more human-resource intensive, having static query-based system with lack of self-learning capabilities and being more time consuming making them almost impossible to scale at DISCOMs with lakhs of meters.

AI, ML and Cloud computing capabilities will be essential to process data efficiently, swiftly and lead to high strike/success rate. In my practical experiences with SJTech Solutions' EIIIS - AI & ML solution implementations at various DISCOMs, the solution was able to exceed 85% strike/success rate in irregularity/theft detection and led to multi-fold increase in revenue per detection without using any new hardware. 1 checking using EIIIS AI & ML system is equivalent to multiple regular checking. It leads to multi-fold impact wherein with the same number of resources and staff more revenue can be generated and provides more than 10x ROI. It led to increase in:

1. Number of checking, detection & regularization of irregularities which led to cascading and integrating effect in reduction of losses
2. Success rate of checking and revenue per detection of irregularities
3. Revenue from irregularity/theft detection
4. Monthly recurring revenue due to regularization of consumers
5. Billing efficiency and collection efficiency leading to reduction of AT&C loss





As per observations of a Distribution Utility:

- The problem of identifying suspicious premises to check is eliminated with this product and it gives officers more time to focus on properly checking connections.
- Dependency on staff is reduced for record keeping and cases can be reviewed easily.
- The product has created an easy-of-monitoring capability which has empowered the Corporate office considerably.
- The efficiency and performance of Vigilance Cell has shown a remarkable improvement.

Many countries can't afford to have all meters replaced by smart meters. In others, smart meter replacement will take significant time. In India too, smart meter deployment will take some time. Meanwhile, India is losing ~183.25 Giga Unit in a year in unbilled but supplied energy.

It is essential to take measures to do the best possible with current DISCOM infrastructure and implement AI & ML solutions which can work well with normal digital meter's monthly interval data, and which are ready to use with a proven successful track record. The amount of money spent on deployment of AI & ML solutions for loss reduction and revenue increment by identification & detection of irregularities/theft will be infinitesimally small compared to amount DISCOM will lose by not acting on it and waiting for smart meters to get deployed which may take up to 2 years.

Conclusion

DISCOMs need end-to-end solutions which are designed to cover all aspects of irregularity/theft identification, detection, post-detection, recovery, and regularisation activities so that there is a free-flow of information throughout the system without requiring much external integration. System should fit current procedure of DISCOM and not require any behavioral change so as to achieve maximum acceptance. DISCOM officers should be able to receive all required & relevant data at a single place on their mobile app even in the field. DISCOM head office should be able to monitor progress in real-time using web modules. ■

Top of the line solutions for Energy Industry

KOSO

Koso India Private Limited is the fully owned subsidiary of Nihon Koso Co., Ltd which is the global manufacturing center for customers worldwide. Our integrated Quality procedures and systems keep our customers satisfied with wide range of products served for various industries with reliability and service-oriented approach.

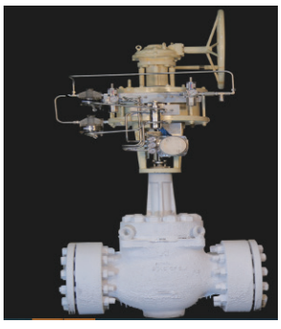
Koso stands apart with capabilities to serve for various applications across Upstream, Midstream and Downstream of Oil & Gas sector, LNG, Fertilizer, Steel, Petrochemical and Power industries.

Vector™ is our Severe Service trim solution that is best fit into customized and standard valve bodies to solve the challenges associated with high pressure drop, erosive and high noise applications. The multi-path, multi-turn discrete flow passages are proven to be the one-shot solution to many valve problems.

Our premium Upstream solution of Chokes for wellhead industry is offered with exotic valve body material under ANSI 600 to 4,500 and API 3,000 to 15,000 body ratings. Tungsten Carbide trim and Stellite or Inconel cladded body offer great resistance to erosive services.

Koso designs valves for cryogenic applications up to -196 Deg C and has many LNG installation references worldwide. Testing is compiled to BS6364 and SHELL MESC SPE 77/200

Apart from these handpicked applications, Koso has

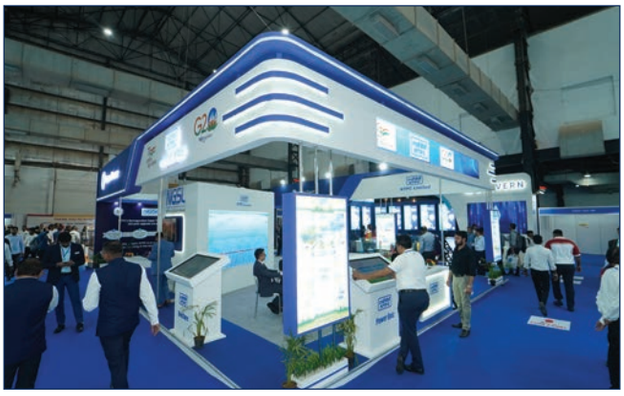


unique range of Ball and Butterfly valves, inclusive of Triple offset butterfly valves manufactured up to 42". Koso offers a one stop solutions for all requirements across the energy industries and have gained reputation worldwide for best in class products and services. ■

Website: https://koso.co.in/

NTPC

GE STEAM POWER



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NORTH EASTERN ELECTRIC POWER CORPORATION (NEEPCO)

POWER GRID CORPORATION OF INDIA LTD.

NLC INDIA LIMITED

REC LIMITED

C&S ELECTRIC LIMITED

MARINE ELECTRICALS (INDIA) LIMITED

AVEVA INFORMATION TECHNOLOGY INDIA PVT. LTD.

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KHOSLA PROFIL PVT LTD

KANOO ENERGY LLC

CLEAN AND GREEN ENERGY SOLUTION PROVIDER

LARSEN & TOUBRO LIMITED

"I wanted to take a moment to express my sincere appreciation for the opportunity to moderate the subject session at this year's event. It was truly an honour to be a part of such a well-organized and impactful conference. From start to finish, the event was impressive. The level of professionalism and attention to detail exhibited by the organizers was exceptional, and it was clear that a great deal of effort went into planning and executing every aspect of the expo. Overall, I believe that the Oil Gas & Power World Expo 2023 was a resounding success. It was a fantastic opportunity for professionals in the industry to come together and share ideas, insights, and best practices. I feel honoured to have been a part of it and look forward to seeing how the event will continue to evolve and make a positive impact in the future. Thank you again for the opportunity to participate in such a wonderful event."

M K Srivastava (P&C)
ED Engineering, NTPC Ltd

"Many thanks for having me as a speaker. It was a good experience, and I particularly appreciated the breadth of experience on display in the panels. I look forward to participating in the future conferences."

Kartikeya G S
Partner, JSA Law

"It was an absolute pleasure for me to attend this conference. I would like to thank the organizers for kindly inviting me to this event of prime significance. I found it meticulously organized that provided a platform for knowledge sharing and interaction with various stakeholders from the industry. Look forward to participating in the event again next time."

Shiromani Kant
GM (Business Development), ACME Group

"It was refreshing for all stakeholders to meet physically during the event after a long gap post the pandemic Response was tremendous from all stakeholders, Exhibitors/ Business visitors from across Globe and the student community. The energy and enthusiasm seen during the technical sessions and also at the venue speaks volumes about the success of the conference. The Oil, Gas & Power event is a popular industry event that brings together professionals from the oil, gas, and power sectors to discuss current trends, technologies, and best practices in the industry. Event has given information about the latest news and updates in the oil, gas, and power industry, including new projects, partnerships, and government policies that could impact the industry along with an overview of current market trends, including supply and demand, pricing, regulatory issues and new technologies and innovations that are transforming the industry, such as new drilling techniques, digitalization, and new form of energy. I found the event to be well-planned and informative. The speakers and panelists were knowledgeable and provided valuable insights into the current state of the Power industries, as well as the challenges and opportunities they face."

Vijay Namjoshi
Chief Generation, TATA Power

"Oil Gas & Power World Expo 2023 was organized very professionally by Chemtech Foundation. The selection of speakers & panellists in the opening program were really distinctive. I congratulate them for organizing such high quality programs on contemporary & pertinent topics."

Shaswattam
Chief General Manager, NTPC (NETRA)

"I want to take a moment to express my sincere gratitude for the opportunity to speak at your event. It was an honour to be in the presence of so many innovative and forward-thinking individuals. Also, it was an absolute pleasure to share my knowledge and insights with such an engaged and enthusiastic audience. Overall, I found the conference to be informative, engaging, and well-organized. The breakout sessions were also well-curated and provided an opportunity to delve deeper into specific topics. I appreciate the efforts made by the conference organizers to provide networking opportunities, which allowed me to connect with like-minded professionals in my industry. The venue and facilities were of high quality, and the event was well managed and ran smoothly."

Suresh Chandra Suman
Director (Mines), Neyveli Lignite Corporation

Chemtech FOUNDATION

International Integrated **ENERGY** Exhibition & Conferences

Oil Gas & Power

World Expo 2023

1-3 March 2023

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

Supported by:

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Concurrent Events

Refining & Petro CHEMICALS 2023 | INLAND WATERWAYS & PORTS World Expo 2023 | MARITIME & LOGISTICS World Expo 2023 | SURFACE ENGINEERING & Corrosion Control World Expo 2023 | COAL World Expo 2023

FACTS AND FIGURES

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

Exhibitors and Visitors from following 28 Countries for Oil Gas & Power World Expo 2023

INDIA, ALBANIA, AUSTRALIA, ALGERIA, AUSTRIA, BANGLADESH, BRITISH INDIAN OCEAN TERRITORY, EGYPT, FINLAND, FRANCE

GERMANY, INDONESIA, ITALY, KUWAIT, MALAYSIA, NEPAL, SULTANATE OF OMAN, PANAMA, POLAND, RUSSIA

SAUDI ARABIA, SINGAPORE, SRI LANKA, THAILAND, TURKEY, UNITED ARAB EMIRATES, UNITED KINGDOM, UNITED STATES

The Future of Recruiting in the Energy Sector

aarvi
Engineering • Manpower • Outsourcing

Jaydev Sanghavi
Executive Director
Aarvi Encon Limited

The energy sector is undergoing a significant transformation as concerns about climate change and the need for sustainable energy solutions drive a shift away from fossil fuels and towards renewable energy sources. As the industry evolves, the demand for skilled and experienced professionals in areas such as renewable energy, smart grid technologies, and energy efficiency is on the rise. Aarvi Encon, a leading staffing firm based in India, is well-positioned to meet this demand and help companies build a strong and sustainable workforce for the future.

Here's how Aarvi Encon is shaping the future of recruiting in the energy sector:

1. **Specialized Expertise:** Aarvi Encon has a deep understanding of the energy sector and the specific needs of companies operating in this industry. The company specializes in the recruitment of technical and non-technical professionals, including engineers, designers, project managers, and support staff. Aarvi Encon's team of recruiters has extensive experience in the energy sector and understands the skills and qualifications that are required for success in this field.

2. **Large Talent Pool:** Aarvi Encon has a large pool of pre-screened and qualified candidates who are ready to work in the energy sector. The company's database includes over a hundred thousand professionals with expertise in renewable energy, energy efficiency, and other areas that are critical to the future of the industry. This allows Aarvi Encon to quickly identify and place candidates who are a good fit for its clients' needs.

3. **Flexible Staffing Solutions:** Aarvi Encon offers a range of staffing solutions, including contract staffing, permanent staffing, and project-based staffing. This allows companies to scale their workforce quickly and easily up or down as needed, depending on the demands of the project or business cycle. Aarvi Encon's flexible staffing solutions are particularly beneficial for companies in the energy sector, which often require a specialized talent for short-term projects.

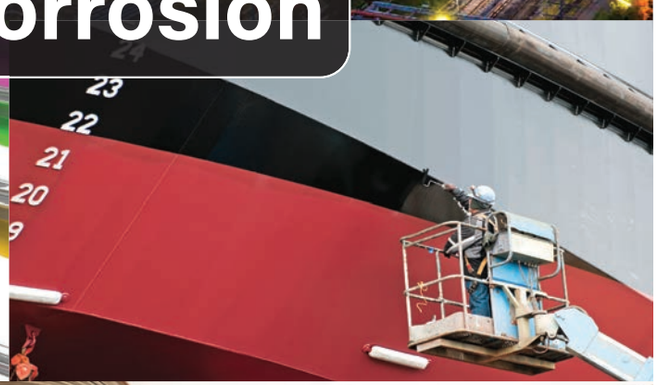
4. **Global Presence:** Aarvi Encon has a strong presence in India and has also expanded its operations to other countries, including Oman, Qatar, UAE, Indonesia, and the UK. This allows the company to source talent from a wider pool of candidates and provide staffing solutions to companies operating in multiple regions. Aarvi Encon's global reach and expertise in the energy sector make it an ideal partner for companies looking to build a diverse and talented workforce for the future. Aarvi has executed projects in more than 25 countries.

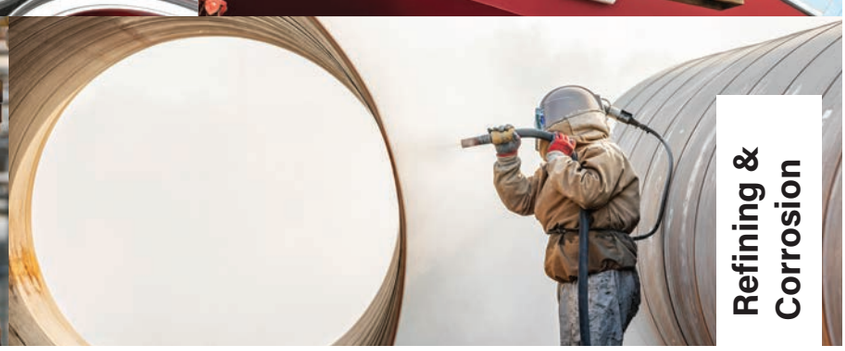
5. **Commitment to Sustainability:** Aarvi Encon is committed to sustainability and environmental stewardship, which aligns with the values of many companies in the energy sector. The company's staffing solutions focus on renewable energy and other sustainable technologies, helping companies to build a more sustainable future. Aarvi Encon's commitment to sustainability makes it a trusted partner for companies that are looking to make a positive impact on the environment.

In conclusion, Aarvi Encon is well-positioned to shape the future of recruiting in the energy sector. The company's specialized expertise, large talent pool, flexible staffing solutions, global presence, and commitment to sustainability make it an ideal partner for companies that are looking to build a strong and sustainable workforce for the future. With its focus on renewable energy and other sustainable technologies, Aarvi Encon is helping to drive the transition towards a cleaner and more sustainable energy future. ■

Website: https://aarviencon.com/

Refining & Corrosion





Refining & Corrosion

Refining & Petro CHEMICALS 2025

SURFACE ENGINEERING
& Corrosion Control World Expo 2025

March 2025, Mumbai, India

www.chemtech-online.com

Refining & Petro CHEMICALS 2023

Challenges in Energy Transition

(L to R) Rajeev Mathur, Director, HCG Group, Convener Gas World Tech Expo 2023; Hemant Shetty , CEO, Chemtech & JMPL; Sukla Mistry, Director (Refineries), IndianOil; Sanjay Khanna, Director (Refineries), BPCL; Prasad Panicker, Chairman, Nayara Energy; Elie Lahoud, Chief Operating Officer (Engineering & Construction), Petrofac; S P Singh , CEO, Adani Total Pvt Ltd & Maulik Jasubhai , Chairman & Chief Executive , Jasubhai Group & Chemtech Foundation & Honorary Consul General of Austria in Mumbai

Sukla Mistry
Director (Refineries), IndianOil
Chairperson CAB
Refining & Petrochemicals World Expo 2023

Sanjay Khanna
Director (Refineries), BPCL
Co-Chairman CAB
Refining & Petrochemicals World Expo 2023

IndianOil

"I congratulate the team of Chemtech for organizing apt conference on Challenges in Energy Transition in Refining & Petrochemicals World Expo 2023. This is one of the biggest and most relevant event of the hydrocarbon industry, where the industry leaders and technocrats meet to discuss challenges & developments in this emerging energy landscape."

Bharat Petroleum
energising lives

"I congratulate Chemtech for completing 50 years of journey and year on year growth in a very big way. I applaud Chemtech not only for getting the industry experts for such mega event but I applaud them for ensuring that a good part goes in getting the students here. I request all the senior industry leaders to interact with the students because we do not know what kind of spark can be given to the students which can be useful in a very big way."

Prasad Panicker
Chairman, Nayara Energy

NAYARA ENERGY

"I am very happy to listen to the refinery directors of IOCL and BPCL today as together their decision will decide the transition of refining industry in India. . There is a sharp division between developed and developing countries. For some of the countries that have climbed the ladder of development, priority may be mitigation but the priority will be to achieve transition without any economic disruption."

SURFACE ENGINEERING
& Corrosion Control World Expo 2023

Corrosion Mitigation: A National Mission
Challenges & Innovations

(L to R) Hemant Shetty, CEO, Chemtech & JMPL; K L Batra, Advisor Chugoku Marine Paints Ltd; C Mathavan, ED-Asset Manager, Mumbai High Asset, ONGC; Dr V Saraswathy, Chief Scientist & Head Corrosion & Materials Protection Division, CSIR - CECRI; Rajeev Gupta, Director Projects, Engineers India Ltd; B Narayan, Group President Projects & Procurement, Reliance Industries Ltd; S K Sur Chowdhury, Executive Director Projects, IndianOil & YPS Suri, Executive Director, Chemtech Foundation during the inauguration of Surface Engineering

D S Nanaware
Director (Pipelines), IndianOil,
Chairman CAB Surface Engineering
& Corrosion World Expo 2023

"When you young graduates join any company with many dreams and aspirations always remember your journey in the company is important, don't worry about the destination, enjoy your journey & be steadfast in your work, do it with passion and competitiveness in this way you will enjoy your journey and life and reach the destination even faster."

B Narayan
Group President Projects & Procurement
Reliance Industries Ltd

"Corrosion losses stood at 4.6% of GDP in 2016. In process industry, internal corrosion is a major risk as there is no access to inside of vessel that makes durability and affordability of equipment as the key challenges. Heat exchangers and cooling systems are worst affected. Corrosion monitoring systems are available for spot assessment but there is a need of systems for continuous monitoring of heat exchangers and long pipelines."

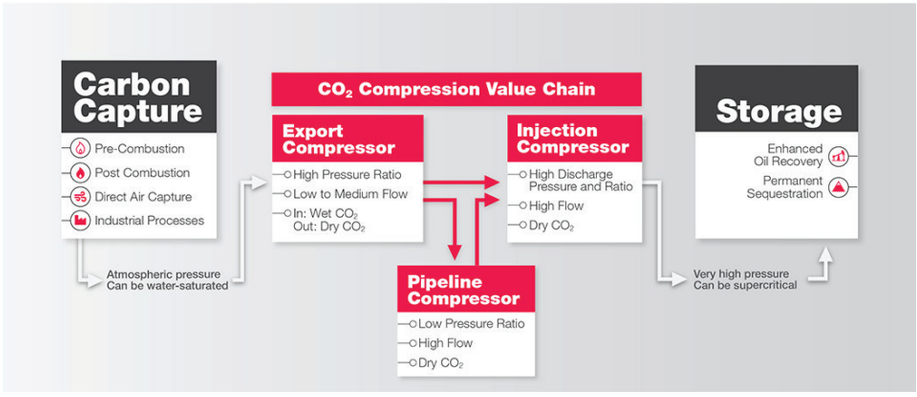
Rajeev Gupta
Director (Projects)
Engineers India Limited

"The progressive deterioration of industrial assets due to corrosion mitigation ultimately leads to losses in efficiency, increase in maintenance downtime and financial losses amounting to hundreds of billions of dollars globally. And around 40% of these costs or losses can be avoided if proper corrosion prevention methods are put in place."

Dr V Saraswathy
Chief Scientist & Head, Corrosion and
Materials Protection Division
CSIR-CECRI

"I am proud to be here with scientists and specialists from TATA Steel, GAIL, IndianOil, Oil India and other companies who are working for the common cause of corrosion mitigation. The industry as well as many youngsters will benefit if we work together to develop solutions together."

Enabling industry achieve sustainable growth targets



Elliott Company was founded in 1912 and has maintained an excellent reputation for over 100 years. Companies around the world choose Elliott Group to design, manufacture, and service their critical turbomachinery. Elliott has been synonymous with innovative engineering, highly reliable products, and unwavering commitment to customer satisfaction. Since 2000, Elliott Group has encompassed the global turbomachinery operations of its corporate parent, Ebara Corporation, headquartered in Tokyo, Japan.

Elliott's fully integrated engineering and manufacturing centers in Japan and the USA are equipped with parallel manufacturing and testing capabilities, and a global supply chain to ensure quality and consistency for Elliott turbomachinery, regardless of manufacturing location.

Elliott's global service network includes 19 service centers around the world, and regionally based field service teams to provide a strong local presence.

Elliott turbomachinery operates in every imaginable application requiring rotating equipment, including oil & gas production and processing, refineries, chemical processing plants, steel mills, electricity generating stations, sugar mills, paper mills, plant oil processing plants, and municipal steam and waste facilities.

Our core products are centrifugal and axial compressors, steam turbines, cryogenic pumps & expanders, power recovery expanders, and related auxiliary equipment.

Driven by Ebara Corporation, we will pursue ongoing growth that achieves our targeted outcomes of reduced greenhouse gas emissions, safe and reliable living, and increased social, environmental, and economic value.

With this understanding of the changing world of sustainable energy transition, Elliott will display our existing and new technologies, and engage with our stakeholders, with our prime focus on customer-centric solutions, which include:

- CO2 Phase Hybrid Compressor Pump Solution for carbon capture, usage, and storage applications
- Environmentally friendly pumps for ammonia to achieve leak-free operations
- Flex-Op® Hydrogen Compressor solutions for operational flexibility in hydrogen pipeline transportation and other applications
- Natural gas (140TCH) pipeline gearless, low-emissions compressor units specifically designed to power long-distance gas transmission

The first of our solutions listed above, our CO2Phase Hybrid Compressor Pump, addresses carbon capture and storage (CCS) technology, which is being implemented around the world for use in many industries. It combines our expertise and extensive experience in CO2 compression and pump technology to develop a solution that addresses the handling of high-pressure CO2. This compressor/pump design is equipped to handle any project and/or equipment related to CO2 compression needs, from atmospheric pressure to typical piping pressure of around 2200 PSI and higher for sequestration requirements.

While each package configuration may vary slightly based on the customer's specific conditions or needs, a typical CO2Phase compressor package would include the compressor, pump, motor(s), gear, lube system, and buffer or seal system. Configurations are available with a double ISO-cooled compressor with a pump and two motors.

This proven, "ready now" technology is ideal for CO2 pipelines or CO2 sequestration. The technology allows for compression of CO2 from near atmospheric pressure to supercritical pressures followed by efficiently pumping the CO2 to the final required pressure. ■

Website: https://www.elliott-turbo.com/default

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- Heavy duty coatings for chemicals & petroleum industry
- Coating systems for thermal power, wind & nuclear power plants
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- Hi gloss polyester top coats
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- Casting sealers & unicoat epoxy chassis black

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- Solvent less Epoxy
- Solvent less PU

GROWEL
SINCE 1957

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Chemicals I Engineering I Paints I Lubricants I Real Estate

"Every project that we are working on is connected with energy transition"

Elie Lahoud
Chief Operating Officer
Petrofac

Dealing with the energy trilemma of energy affordability, sustainability & security feeds directly into the planned investments by the project developers driven by their own circumstances. While sustained spending is visible in the oil & gas sector there will be an acceleration of investment in new energies. ***Elie Lahoud, Chief Operating Officer, Petrofac*** *shares, the energy services provider is executing a significant number of feasibility and early-phase projects in areas of green hydrogen, green ammonia, carbon capture, and waste-to-value sectors. He observes strong prospects for in India the way country is navigating the journey of energy transition.*

How are the future energy ambitions changing for the project developers globally? What patterns do you see in investments across coal, oil, gas, and clean fuels – both in terms of power and end-use efficiencies as organisations, industries and countries try to meet their net-zero commitments?

Decarbonization is inescapable globally. But it is just one aspect of the so-called energy trilemma as companies, industries and countries are seeking to find the best long-term balance between energy security, energy affordability, and energy sustainability.

In Europe, for example, there has been a scramble to invest in LNG capacity, and to accelerate the shift to renewables. Under its RePowerEU plan, the European

Union targets an additional €210b investment, which includes €86b for wind and solar, €27b for hydrogen, €29b for power grids upgrades, and €56b for energy savings and heat pumps. Meanwhile, in USA the scene is dominated by a raft of new legislations, like the Infrastructure Act and the Inflation Reduction Act, accompanied by a USD 2trn investment. These initiatives aim at reindustrialising left-behind regions, reducing the reliance on certain imports, and significantly ramping-up emissions reductions.

Here in India, it is a matter of enabling industrial and economic growth while, at the same time, reducing the dependency on imported oil to edge towards a 2070 net-zero target. We see policy initiatives like Atmanirbhar Bharat (self-reliant India), and the ambition to transform the country's abundant coal resources from an environmentally hazardous fuel into an eco-friendly chemical feedstock.

Across the globe the countries and regions are weighing up the three common themes of energy affordability, sustainability and security according to their own circumstances. This feeds directly through to the investments being planned by refining and petrochemical project developers, from the commodities they produce, to the feedstocks they use, to the way they mitigate process emissions and powering the facilities which impacts their need from their EPC partners.

What kind of challenges do you anticipate for the EPCs & engineering services providers? How is your own organisation responding to the vagaries of the project management space?

See there is no shortage of natural energy resources, be it wind, sunshine, or waves in the world. The challenge is to find how best to channel, store and transport that energy, and do so in a way that is safe, secure, and economically viable.

At Petrofac, we enable our clients to find the right solutions to meet the world's evolving energy needs by using our expertise gained in oil and gas and applying it in the new energies. For example, our practical

experience in gas handling, hydrocarbon processing and transforming waste feedstocks into low carbon fuels along with the expertise in design, integration & operations of complex energy facilities & infrastructure directly applies to the new energy projects. We aim to work with clients as true partners in multiple ways by helping them select the right technologies or vendors, developing first-of-a-kind concepts and deploying commercial models that align with their goals. For example, the engineering and procurement work could be handled on a reimbursable basis and the construction phase converted to lump-sum once the detailed design is firmed up.

As compared to 2021, the overall revenue of Petrofac was lower in 2022. How is the group planning to bounce back? Tell us the key areas in terms of business verticals and geographies the group is currently focused upon to drive the growth.

Our performance over the past two years was impacted by the after-effects of the pandemic, which added to project costs and delayed new contract awards. With these issues in the rear-view mirror, we are now gearing up for future growth. We are active in the most robust hydrocarbon markets within the upstream, refinery and petrochemical sectors and expect to see sustained spending. At the same time, there will be an acceleration of investment in new energies which will drive strong growth in offshore wind, carbon capture, hydrogen, and waste-to-value projects.

Petrofac's major projects in India include upgrades to the Kochi Refinery, the Visakh Refinery Modernisation Project, and the Raageshwari Deep Gas Field Development Project. The energy services provider is now getting active in Operations and Maintenance and recently been awarded contracts from Cairn Oil & Gas.

With our strong credentials and a rapidly developing track record, we expect to see exponential growth.

Please share insights into some of the worldwide ongoing and future key projects of Petrofac in the space of Energy Transition?

Globally, asset owners are already thinking about mitigating emission intensity and every project that we are working on is connected in some way with the energy transition. The attention of project owners is shifting to using cleaner and lower intensity fuels like gas, they are focused on enhancing efficiencies of existing assets and having sustainability as the core of designing new assets. At the same time, we are witnessing a surge of interest in new energies and currently Petrofac is executing a significant number of feasibility and early-phase projects in areas like green hydrogen, green ammonia, carbon capture, and waste-to-value sectors – not just in the UK and Europe, but also in markets like Egypt, Oman and the UAE.

Talk to us about Petrofac's new energy project portfolios in countries like the UK and the Netherlands. How do you plan to take these to other global markets?

Today, the biggest, most material opportunity is in the field of offshore wind. We have contributed to more than 20 offshore wind farms, including the delivery of major EPCI projects for high-voltage transmission stations for UK, German and Dutch developments. In areas of hydrogen, carbon capture, and waste-to-value, large-scale opportunities may be taking longer to materialise, but we are nonetheless busy on pre-FEED and FEED assignments and helping clients to convert projects from FEED to EPC execution.

Green hydrogen is an interesting area and several self-contained projects are moving forward in the UK & Europe. Companies in food & beverages are inclined towards producing hydrogen onsite and use it for decarbonizing industrial processes and power their delivery vehicles to meet their Net Zero commitments and use in marketing

messaging. By demonstrating the potential of hydrogen and proving that with some smart thinking, it is possible for individual businesses to move ahead to a

greener future which also serves a wider social purpose. The large scale export hydrogen initiatives are taking longer to materialise. But having said this, we are working on the early phases of mega size export projects located in the Middle East & North Africa. These regions have abundance of wind & solar resources, land, an established port infrastructure and an energy mind-set. As the market matures and the policies shape up, we will be able to improve the understanding of economics of setting up such projects and establish more projects.

We expect more projects to come up in the future; and with the proven experience of setting up projects in the UK & Netherlands and strong credentials Petrofac can be a true partner for the clients to enable them to develop new energy portfolio.

What kind of opportunities do you see for Petrofac in India across upstream, refining and petrochemicals and new energies?

India has long been at the heart of our business, and the country is important to us for two main reasons. First, it support our global operations through engineering centres in Mumbai and Chennai. We run several of our back office corporate functions and have also started to use India as an operations hub for bids and projects being delivered elsewhere in the world. We have a strong locally based procurement team and often source components and fabrication from India.

Second, India is an important market in its own right. We have delivered several major projects here, like the upgrades to the Kochi Refinery, the Visakh Refinery Modernisation Project, and the Raageshwari Deep Gas Field Development Project. We are now getting active in Operations and Maintenance and recently been awarded contracts from Cairn Oil & Gas.

We have been investing in building local capabilities and appointed Vivek Agrawal as our new Country Manager. Globally, Petrofac operates on local delivery models which includes identifying vendors & suppliers, nurturing local talent and capacity building.

As the global energy transition gathers pace, the level of interest in new energies will gain momentum.

Going forward, we see very active bidding pipeline as India is on the verge of completing a full round of investments for existing refining & petrochemicals facilities and there are major plans afoot for coal gasification and building methanol capacity. We also see interesting opportunities in bio-fuels. Given the projected growth in the Indian economy, and the way that India is set to navigate the energy transition, the prospects for the energy industry are strong – and we hope that we can support our Indian clients in helping to meet the country's evolving energy needs. ■

Petrofac has contributed to more than 20 offshore wind farms, including the delivery of major EPCI projects for high-voltage transmission stations for UK, German and Dutch developments. In areas of hydrogen, carbon capture, and waste-to-value, the group is busy on pre-FEED and FEED assignments and helping clients to convert projects from FEED to EPC execution.

Alternate & New Energies for Oil Gas & Power

Dr Purandar Chakravarty
Head of Innovation & Alternate Energy
Nayara Energy

India across the last few decades and its political journey has indeed been focussed on Alternate and New Energy domain. Evolving from the 80s with a department called DNES (Department of New and Renewable Energy Sources) in the central governance, it evolved into a full Ministry – MNES which is now MNRE. However, the enhanced focus came after signing, The "Paris Agreement" - a legally binding international treaty on climate change. It was adopted by 196 Parties (countries) at COP 21 in Paris, on 12 December 2015 and came into force on 4 November 2016. The Paris Agreement is a landmark in the multilateral climate change process. For the first time, it brought all nations into a binding agreement for a common cause, to undertake efforts to combat climate change and adapt to its effects.

Globally profound changes took place after the Paris Climate Change Treaty; and a multidimensional focus emerged in the domain of renewable and alternative energies to address climate change. To begin with, the immediate focus was on the power sector and that led to a multi-fold proliferation of renewable energy. At a country level, India brought on many regulatory frameworks which had their impact on this domain. These include regulations

like - RPO, PAT, alternate fuels for blending, and so on. India further took ambitious targets during COP 26 at Glasgow in 2021 and this scenario implied that the industry at large needed to comply with many regulations towards adopting cleaner solutions. An indication towards such a push can already be seen in the proposed Energy conservation amendment bill-2022, wherein the government plans to enable provisions to make use of clean energy, including green hydrogen, mandatory and to institute a regulatory framework for carbon trading within the country.

In this evolutionary journey to address climate change in an equitable manner, focus extended from the power sector to other hard-to-abate sectors like oil and gas, steel, cement and so on. Speaking specifically about the Oil & Gas sector, globally, the transport sector contributes to about 21% of total global emissions out of which refining contributes to about 2.5%-3%. So, while a major portion of this emission comes from the usage of fuel in the surface, marine and aviation domain; addressing it requires creating a conducive regulatory and techno-commercial ecosystem. The evolution of such an ecosystem can only be possible with contribution from governance, OEMs at various levels and also with mindful and empowered societal landscape. Many initiatives by the governance and participating OEMs in terms of promoting LNG, Ethanol blending in fuels, Ammonia as a fuel for Marine domain (e.g., Maersk implementing globally), sustainable aviation fuel to partially substitute ATF are being promoted.

In this Macro National level Energy Transition landscape, the important point is that the Oil & Gas sector has an uncompromising role to play by providing the basic fuel component to bring about this transition. This is what brings out the core aspect that, in this entire canvas while Oil and Gas industry at large strictly abides by the regulations and is certainly committed to cleaner fuels, products and processes, what choices it has to achieve this focus on Green and Clean energy as well as while doing so reducing its own emissions in a manner which is a value proposition and a business case as well. This is an extremely seminal point since it defines the future of this industry at large. As a matter of fact, slicing this analytically leads to many practical and doable approaches.

To begin with, an extremely valuable approach would be to see the applicability of the interventions suggested under the Mckinsey study on CO2 abatement cost curve for Oil & Gas. As can be seen there are a host of initiatives of which many of them are actually value propositions or business cases. While true abatement approaches like CCS are perhaps the ultimate to reduce emissions; these and also DAC (Direct air capture of CO2) are still far away from being business cases.

This is definitely not so when it comes to CCU. Interestingly, CCU options to capture CO2 and convert it to fuel Ethanol or chemicals like soda Ash and so on, are very viable & true business cases. On similar lines coming to renewables while it apparently looks very attractive because of its inherent low production cost for energy in the absence of feedstock cost; because of intermittency and applicable state-centric power regulations, its viable applicability needs careful evaluation. To give an example, if renewable energy is procured from off-site under a third-party model the delivered cost of renewable at the user bus bar subject to local state regulations could become more than double the purchase price and thus making viability challenging. Options to address such issues involve developing innovative business models which are CAPEX light such as group captive, JVs jointly with the developer, etc. to make the best use of regulations and cost of energy. Limitations of State regulations can also be addressed by opting for connectivity through ISTS or CTU. At the end, while all these options are subjective to the conditions of the specific industry, the underlying fact is through careful approach viability can be established.

Many initiatives by the governance and participating OEMs in terms of promoting LNG, Ethanol blending in fuels, Ammonia as a fuel for Marine domain (e.g., Maersk implementing globally), sustainable aviation fuel to partially substitute ATF are being promoted.

Another recent domain today is Green Hydrogen. The main emission sources in larger conversion refineries are, in order of importance- the power station (29% of total emissions in an average refinery), fluid catalytic cracking unit (19%), atmospheric distillation units (19%), and steam methane reformer for hydrogen production (11%). India is bullish on green hydrogen, and some industry houses have made encouraging announcements of bringing down the cost of green hydrogen to very competitive levels at scale. However, because of the significant dependence of the production process on huge amounts of renewable energy which is primarily intermittent in nature, the capacity utilisation of electrolyser becomes very low and thereby enhances the cost of green hydrogen among other factors to a significantly higher level. Addressing the challenge of renewable availability through RTC (Round the clock) mode coupled with REC from energy exchange to substitute for the dark periods can be a viable solution in such scenarios. Industry-specific simulations of such nature are today very much possible and industry can plan an entire decarbonisation and energy transition scheme coupling with generation of renewable energy along with production of green hydrogen to substitute for uses of Grey Hydrogen. Taking such holistic approaches and curating them to the specific needs of the Oil and Gas sector actually has the potential to offer value; and viable business case propositions for the domain and therefore transition to Green and Clean energy by the sector is truly achievable. This together with technological advancement is perhaps the order of the day to bring about the much-anticipated value addition in the Oil & Gas sector towards its transition to Clean and Green energy and de-carbonisation.■

Disclaimer: *The views expressed in this column is strictly professional of the subject area and does not represent the views of the organisation.*

Innovations in stone to tackle tomorrow's challenges

When it comes to the health and safety of employees working on and around plants, harmful noise, heat and fire is a consistent threat. The safety of the plant and its workers is measured on many parameters. Liquids or gases flowing through uninsulated giant pips increases the risk of any hazard, also create a lot of noise and heat which can cause health hazards for the workers. Plant equipment without insulation can be a reason for fire casualty. With the right insulation installed, gives complete protection to the plant equipment, also becomes more energy efficient, reduces operating costs, also reduces the possibility of an accident.

ProRox MA961

Our newly launched ProRox MA961, is a rolled stone wool insulation mat (wrap) faced as standard with black fibrous scrim. The mats are produced with an innovative water-repellent binder, known as WR-TechTM, to mitigate the risk of corrosion under insulation. WR-Tech ensures our stone wool maintains its superior water repellency even at elevated operating temperatures within the CUI range, while preserving its excellent thermal performance in use. ProRox MA961 solutions deliver great acoustic capabilities that help reduce those harmful noise levels – for the protection and performance you need. The mat (wrap) is suitable for the thermal and acoustic insulation of high-temperature industrial applications exposed to the environment and subjected to light mechanical loads, such as large diameter piping, vessels, ducts and equipment.

ProRox range enabled with WR- Tech

Corrosion is major issue in the industry. Corrosion under insulation (CUI) is a leading threat to the effectiveness and safety of virtually every production facility. A risk that demands a comprehensive solution. ROCKWOOL ProRox series of products provides the difference between Corrosion Under Insulation (CUI) and reliable protection for the infrastructure.

Our ProRox range of solutions with WR-Tech are designed and tested to deliver a multi-faceted approach to CUI prevention. By greatly reducing the potential for water absorption without losing the breathability that allows our stone wool solution to dry out more quickly, ROCKWOOL does more to ensure CUI doesn't cut into your productive time. WR-Tech is the first Water Repellency Technology for industrial insulation. Typically used and requested by major operators in industry. NACE awarded WR-Tech the 2019 Materials Performance Corrosion Innovation of the Year Award.

New Innovations in stone to help us tackle tomorrow's challenges

Our new innovations in stone can create opportunity and help us tackle tomorrow's challenges. Each of ROCKWOOL products combines the 7 strengths with one ambitious goal in mind: to minimise the human impact on our surroundings, whilst maximising the safety and wellbeing of all the industries with our products. We are in India for more than eight years and are representing a global brand established for 80 years ago with presence all around the world. In India our business has been growing in leaps and bounds in the past years, and we do have a strong outlook for India business for the future to embark on a journey of sustainable business growth. We are looking forward to work with all types of process industries to increase their thermal efficiencies and bring down their carbon footprint by way of our high-performance ROCKWOOL insulation products.

Sustainable business to create long term impact on society

We always give our best to create a positive influence. Our aim is to create the best experience for our customers so every time they think about insulation they think about ROCKWOOL. In the tenure of last 12 years in India, we have helped many customers to provide a healthier and safer environment for the inhabitants of the buildings. ROCKWOOL is a leading brand in insulation industry. Our commitment is set in stone, and we serve our customers in the best way possible to keep their business up. Our commitment to safety and wellbeing extends to our products as well, which include non-combustible insulation and cladding that help stop the spread of fire as well as our acoustic ceiling tiles that reduce unwanted noise and help create healthier, more productive, and less disruptive indoor environments. Every time we provide our customers with the best solution for their building needs that's the passion that drives us forward each day. ■

Website: https://www.rockwoolindia.com/

IPCO: A World-class Technology Solution Provider

Kumar Swamy
Managing Director
IPCO Process & Belt Technology India Pvt. Ltd

IPCO is a prominent engineering group that offers customized process equipment solutions to various industries, including oil/gas, chemicals, pharmaceuticals, automotive, aerospace, construction, and food.

It is recognized globally as a top-tier technology solution provider that operates independently under FAM AB, a part of the Wallenberg Group. With over 600 employees, more than 30 sales and service offices, and an annual sales turnover exceeding €200 million, IPCO is well-established organization and offers sustainable solutions to its clients.

IPCO has a vast network of regional offices that allow it to provide local expertise and support to its global clients. In India, IPCO operates under the name **"IPCO Process & Belt Technology India Pvt. Ltd."** and is situated in Pune. IPCO has engineering expertise in a wide range of areas, from steel belts used in conveying and processing applications to systems used in the production of composite materials. IPCO's granulation and solidification technology is particularly relevant to the chemical and refinery industries.

Having been involved with the oil and gas industry for over 70 years, IPCO has developed expertise in designing, supplying, and commissioning complete end-to-end solutions, covering everything from the receipt of molten material to the storage and loading of solid material. IPCO's offerings are versatile and can be applied to hundreds of potential applications in various fields, such as chemicals, oil and gas, composites, powder paints, turnkey solutions, and more.

IPCO values flexibility, the ability to act quickly, and a genuine focus on meeting customer needs. Overall, IPCO is a multinational company that operates with the advantages of a mid-sized entrepreneurial company, making it a reliable choice for customers in need of technology solutions.

ROTOFORM – MARKET-LEADING PASTILLATION TECHNOLOGY

The Rotoform® is IPCO's flagship solidification system that has been installed more than 2000 times since the early 1980s.

At the heart of the system is a heated cylindrical stator which is supplied with molten product via heated pipes and filter. A perforated rotating shell turns concentrically around the stator, depositing drops of the product across the whole operating width of a continuously running stainless steel belt.

The rotational speed of the Rotoform is synchronized with that of the steel cooling belt to allow the liquid

droplets to be deposited onto the moving belt in a uniform shape and size. Heat released during cooling and solidification is transferred via the steel belt to cooling water sprayed underneath, resulting in controlled solidification and the production of consistently sized pastilles.

This process offers environmental advantages as cooling water never comes into contact with the chemical and solidification takes place quickly, resulting in low emission values. Today, Rotoform has become the default solidification solution for hundreds of chemical products including base chemicals, fine chemicals, specialty chemicals (e.g., pharmaceutical, and cosmetic products), waxes and oleochemicals.

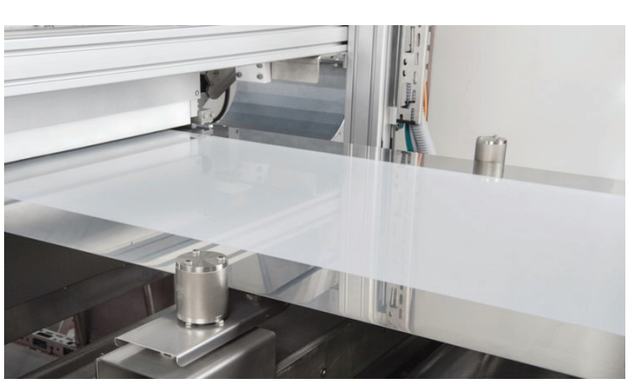
While the core principle – direct-from-the-melt solidification on a steel belt cooler – remains unchanged, Rotoform technology has undergone significant advances over the years.

Advanced Technology in Chemical Processing & Melt Solidification

In 2013, the corporation unveiled the Rotoform 4G (Fourth Generation), which serves as the cornerstone for a complete range of models designed to fulfil particular process requirements. These encompass the production of coarse and settling substances (e.g., suspensions, catalysts), as well as melts necessitating high feeding temperatures (e.g., bitumen, resins), and the solidification of subcooled melts in supercooled plants (e.g., antioxidants for the tire industry). "Rotoform 4G" provides a user-friendly upkeep experience. Additionally, another model, "Rotoform HS," is extensively employed in the refinery sector for their high capacity to process sulphur, resulting in quality production in compliance with SUDIC specifications.

The latest versions include the Rotoform HP (High Performance), designed to manage high-viscosity substances, such as resins and hot melts, at greater capacities. Paraffin waxes and microcrystalline waxes, which are by-products of crude processing, are utilized to produce premium pastilles of exceptional quality. These premium pastilles are used in cosmetics, healthcare, pharmaceuticals and food grade products. In the refinery sector, double belt cooling and flaking technology for asphaltene pitch has provided a value-added solution for bottomless refining.

Apart from this, IPCO has a range of offerings in Film Casting. Steel belts were initially introduced in 1901 for heavy-duty industrial operations but are now used in the manufacturing of high-precision products, including optical films, ceramic tapes, and membranes for batteries, which are typically up to 10 microns. IPCO has now created a continuous film casting system that significantly enhances the casting process, enabling the manufacture of film products to exceptionally narrow tolerances. Films can be produced with dry thicknesses, depending on the end application.



IPCO's Single Belt film casting machines provide several advantages, such as highly efficient continuous production and the capability to cast extremely thin films with fine accuracy. This method can also be utilized to manufacture microporous membranes of superior quality that cannot be achieved through any other approach. IPCO's Film Casting Solution is available for manufacturing medical membranes,

which are critical components in certain healthcare applications, including diagnostic tests. Most diagnostic or liquid treatment membranes are produced using a phase separation process that relies on steel belt technology. IPCO's film casting system with high precision can meet three essential requirements: a design that complies with GMP standards, high precision standards, and exceptional reliability.

In addition to these domains, IPCO also provides solutions in Composites, including units for single belt casting and double belt casting of solid acrylic surfaces. These products have diverse applications, from household furniture to aerospace technology.

Evolving competition and how IPCO is positioned in Indian and International markets

We are strategically positioned in one of the manufacturing hub-Pune. In India, IPCO operates with a relatively small team compared to number of orders handled. Therefore, we need reliable external partners too, i.e., local sub suppliers, with whom we work on a regular basis. Another challenge is that many Government PSU customers wish to do business with us as a Turn-key projects in local currency as a part of promoting "Make in India" & saving foreign exchange. Since we have close collaboration with locally based manufacturers and suppliers, a major part of the order amount can be invoiced in local currency. Thus, we are providing a complete end-to-end solution including upstream, processing equipment & complete Downstream handling solution along with peripheral structural equipments & control system as a single point responsibility.

IPCO's key message to customers is that by choosing IPCO they get German engineering, Western quality equipment, and local service. This is attractive differentiation as far as some customers are concerned and one that gives us competitive edge over other competitors in our business. Our customers continuously develop their products. IPCO Productivity Centres, located in Germany, USA, Japan, are ready to co-research and co-develop the new formulation, or act as an extension to customers' R&D.

Future Plans

IPCO is coming up with their latest and futuristic manufacturing facility for Steel belt production in Forsbacka, Sweden. This will provide a competitive advantage.

In addition, Continuous improvement has been a culture in the company since its establishment. New design of Rotoform for higher efficiency and even easier maintenance is in development. Steel belt new grades, stronger, longer lasting, higher resistance to harsh chemicals, are regularly added to IPCO portfolio. ■

Website: https://ipco.com/

Delivering Complex Projects With Agile Project Management

Dhaval Wagh
Manager Project Management (Oil Gas & Chemicals)
Burns & McDonnell India

With its step-by-step methodology, waterfall project management remains the preferred delivery model for projects with an end result clearly established from the beginning. But for complex projects with evolving or ambiguous requirements, agile project management — with agility and flexibility built in — may be worth a closer look.

Just 55% of construction projects in 2021 were completed on time, according to the Project Management Institute's (PMI) latest Pulse of the Profession report. PMI also reports that 38% of 2021 projects exceeded their original budget, and 27% did not meet the owner's original business goals and intent.

In addition to the COVID-19 pandemic, the reasons for this underperformance vary, from limited planning time and scope creep to extreme weather conditions and poor project management. In some cases, the approach to project management, rather than the execution, falls short. In fact, more challenging projects often perform far better when traditional project management is replaced with newer, more agile approaches.

Project management alternatives

Designers and builders have historically relied on waterfall project management, a linear method of performing projects in sequential steps. It begins with a project being planned, start to finish, with clearly defined requirements, expectations, and scope. Only after the deliverables for any given step are complete does the team progress to the next one. This highly structured, document-heavy approach is most successful on projects where the final product is clearly defined and understood, and adequate time is available for project planning.

While waterfall project management brings rigor to processes that can be refined and repeated on future projects, it also has disadvantages. For example, it includes very little built-in flexibility for changes along the way — which can become problematic when issues arise, or disagreements emerge over project objectives among stakeholders in the later stages of execution. Because of its linear nature, projects can also take longer to complete. Issues with one phase's deliverables may not be discovered until a project has entered a new phase, raising the prospect of costly rework.

Beginning in 2001, an alternative approach emerged. That is when 17 software developers worked together on a management solution for projects whose end products were not so clear-cut. Their discussions centered on ways to meet project budgets and schedules when working through requirements that were volatile, uncertain, complex or ambiguous. They were also interested in developing ways to speed innovation that was sometimes slowed by strict adherence to process-driven methods.

Their collaboration culminated in the publication of the Agile Manifesto, a brief document that outlined a new, more flexible project management philosophy. Rather than describing a strict method, it described four principles that inform an agile mindset:

- **Unity**: Individuals and interactions over processes and tools, declares the first principle of agile project management. This principle may seem like a dramatic departure from waterfall project management, which trained generations of project managers to strictly follow processes. Agile project management does not reject processes but seeks to guard against situations were completing the process — rather than developing an innovation solution — becomes the end goal. Agile project management instead prioritizes interactions among team members. Because developing unity among team members can be difficult, frequent meetings and interactions help create cohesion and a sense of belonging. Both are key to project success.

- **Simplicity:** Working products over comprehensive documentation, is the second principle of agile project management. This principle reminds team members that delivering a superior product is more important than producing superior documentation. While project documentation is necessary, prioritizing its development can impede final project delivery.

- **Transparency:** Customer collaboration over contract negotiation, is the third agile principle. This reminds team members to involve their client throughout project development and to consider the changes the client desires as the project progresses. While even a voluminous contract document cannot anticipate every modification a project may require, a strong relationship forged by a truly transparent agile approach can result in simpler, more effective negotiations.

- **Adaptability:** Response to change over following a plan, asserts the fourth and final principle of agile project management. The method and speed by which an agile team adapts to emerging needs demonstrates its adaptability. A rigid team that rejects owner suggestions may meet a project's budget but fail to achieve its larger objective. An adaptable team that embraces client-driven changes may, on the other hand, fast-track a project's success. Teams able to anticipate and respond to obstacles also forge better outcomes. They represent adaptability in its truest sense.

Agile project management's impact on design and construction

While originally conceived for software development, agile principles are now used in project management by industries worldwide, including design and construction. Its appeal lies in its simplicity and flexibility.

In practical terms, agile project management replaces traditional project phases with an iterative approach to project delivery. Rather than following a linear path, these projects evolve as team members work on multiple project phases at the same time. Procedures are repeated as the project team's understanding of the end product increases.

With each iteration, the project team has the flexibility to experiment with or change the project's direction. Because of the transparent nature of this approach, the team shares its progress with the client and incorporates feedback as the project progresses. Deadlines are often short to encourage efficiency.

Consider, for example, the piping, electrical and instrumentation design for a new refinery. With traditional project management, 3D models of these designs might be reviewed with the client only at agreed-upon milestones, such as at 30%, 60% and 90% completion. With agile practices, key personnel might review progress every week or two. This approach helps avoid surprises and gives the client an opportunity to respond to changes in near real time.

Multidisciplinary teams often find that they innovate more and move through a project development's life cycle more quickly using an agile approach. But agile has potential downsides as well. Because team members are working on multiple phases at a time, the potential for overlap or wasted effort looms. Because early-stage deliverables are not required before the team looks to later stages, effective communication is essential to keep the project team on the same page. Project timelines are also more difficult to project, given that these projects are more susceptible to change.

A helpful way to compare waterfall and agile approaches is through the lens of the constraints every project face. Regardless of project management approach, a project manager must juggle and work

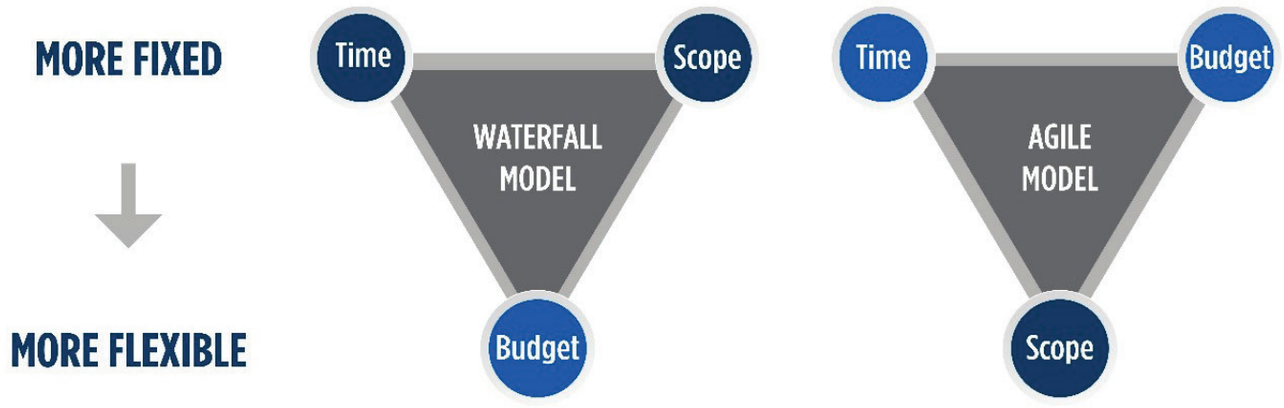


Figure 1: Each of the three main project factors can be thought of as the vertex of an equilateral triangle.

within the confines of its scope-of-work, budget, timeline, and quality requirements.

Project quality and success are most influenced by the other three constraints: scope, budget, and timeline. See Figure 1.

With traditional waterfall project management, the budget is driven primarily by the scope of work and the time in which the project team must complete the work, both of which are largely fixed from the onset. If one of these two factors changes, the budget will be impacted. With agile project management, the calculus shifts. The project schedule and budget remain constant from the start, while the project scope may be subject to change as the project team completes its iterative processes.

In practical terms, an agile project team with a flexible scope still maintains a change management process. Managed effectively, however, an agile project rarely needs to use a change management procedure. Rather, the project team keeps its client abreast of each iteration of the project, and the client is invited to review and contribute suggestions for improvements along the way. A rigorous change management procedure only becomes necessary when changes may be unhelpful or unnecessary.

Let the Management Style Fit the Project

Because agile project management does not prescribe specific practices, it is highly adaptable. Users with an agile mindset can internalize its principles but then customize or omit specific practices based on the right fit for their project requirements. As they consider each principle from the Agile Manifesto, they strike a balance between the two sides and find a framework that works for them.

Even so, agile project management is not right for every assignment. Because waterfall methods are change-averse, they are typically a better choice on projects with requirements and designs that are not expected to change over the course of the work. Agile approaches, on the other hand, are designed not only to accept change but also to encourage and facilitate it through frequent iterations and client feedback. That does not mean that a change in scope is inevitable. Agile project managers simply recognize that the scope may need to be tweaked to achieve the desired result.

Ultimately, both waterfall and agile approaches have a place in design and construction. In some cases, they can be modified and blended to meet specific project needs. Successful and sustainable organizations know when, where and how to adopt and deploy them both to achieve optimal results. ■

Website: https://www.burnsm cd.com/

A Joined-up Approach to Scope 1-3 Decarbonization

The hydrocarbon industries are major Scope 1-3 emitters and are coming under increased investor, consumer, and regulatory pressure to reduce emissions. Cumulative greenhouse gas (GHG) emissions from refineries worldwide reached approximately 34 gigatons (Gt) from 2000 to 2021 with an average annual increase in rate of 0.7%, making the global oil refining industry the third-largest contributor to greenhouse gas (GHG) emissions from stationary sources (Ma et al., 2022).

In response, most refineries have set ambitious reduction targets for 2030 and 2050 with net-zero Scope 1 and 2 emissions being the focus of the former and replacement products being the latter. Currently, emission reduction and energy efficiency are the focus of Scope 1 and 2, and companies worldwide are driven by either government regulations, subsidies, and/or incentives depending on the location. A lack of clarity on either can hamper the pace of investment and many companies find themselves locked in this boardroom debate.

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What it is and what it is not

Hydrocarbon operations must begin a journey of becoming energy complexes with an actionable plan to eliminate fugitive emissions, decrease carbon footprints in day-to-day activities, substitute products for lower carbon versions and, ultimately, replace carbon in favour of other molecules such as hydrogen, oxygen, and nitrogen. The United Nations Sustainability Development Goals and subsequent classification of Scopes 1-3 decarbonisation initiatives is helpful to establish common definitions and alignment. However, change needs to occur in upstream and downstream hydrocarbons to meet sustainability goals, which require a 45% reduction in global CO2 emissions by 2030 from 2010 levels, and net zero emissions by 2050.

Each operating asset is different and will require a dynamic roadmap charting the appropriate course. What it is not is 'Scope 1, 2 and possibly 3' it is 'Scopes 1-3,' and a joined-up approach is required that maps out the decarbonization journey. It draws on practical experiences, best practices, and current leading-edge technologies. Reducing Scope 1 emissions is a given, self-imposed next step, but how shall we proceed? Which option is the best choice – a

digital energy management system, a new gas turbine with furnace exhaust integration, a hydrogen or ammonia fired gas turbines, and/or the use of renewable power generation? While the choices are vast, the impacts from each are significantly different. So, how does an operator conduct a joined-up approach to Scopes 1-3 decarbonization and how can we transform a challenge into an opportunity that lasts decades?

Best practices

The best practice is to reflect on the big picture. Look across Scopes 1-3 today and out 10-20 years of operation. Then, construct a strategic roadmap that converts strategy into action by:

- Getting a clear view of the current situation.
- Identifying all drivers of GHG emissions.
- Brainstorming all the possible common and uncommon options prioritised by viable options.
- Developing a credible, technically rigorous tool kit to map potential paths to achieve emission reduction goals.
- Narrowing the wide range of potential solutions by evaluating the business attractiveness of each, then comparatively and assesses the risk both technically and financially to avoid the potential for regret capital.
- Understanding the optimal sequence of investments based on the capital outlays of many options and likely minimal returns and potential for change or regulatory uncertainty.

The roadmap extends beyond just managing emissions and efficiency. It also involves managing the risk of optionality in regulations, uncertainty in technology, and driving organization-wide change. The use of proven technology today enables detailed scenario planning ensuring a robust solution for an asset. KBC's approach for an individual facility is to build an Integrated Process, Energy, Emissions and Economics Model (IP3EM). The IP3EM illustrates the energy demand, supply, and consequential emissions of that energy supply, where we detail the following:

- Understand the actual Scope 1 and 2 emissions savings from mitigation or carbon capture alternatives.
- Identify initial quick wins to start the process and build momentum.
- Deploy a Digital Energy Management System to ensure process deviations are handled immediately and progress is sustained.
- Design an approach that can be extended to include the modelling and characterisation of bio feedstocks, other renewable feeds such as woody biomass, emerging technologies such as plastic recycling, and evaluate their integration into current systems and impact on Scope 3 emissions.

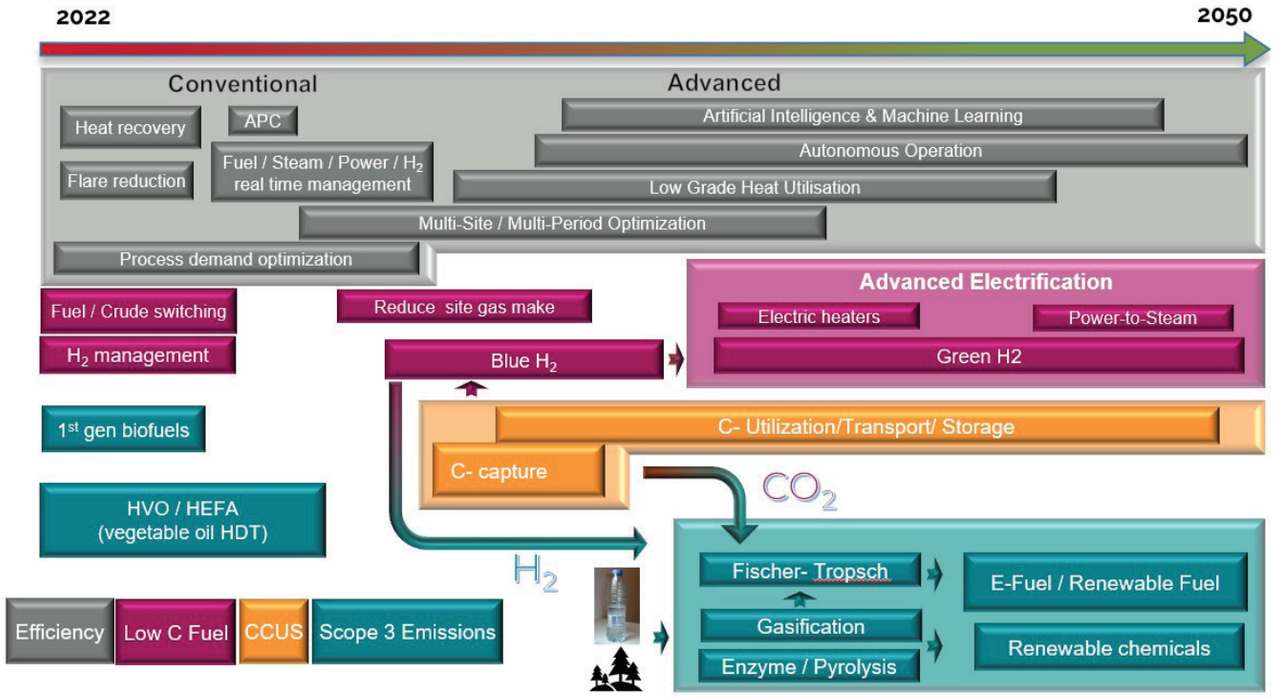

Figure 1: Examples of options in Scope 1-3 emissions reduction

- Joined-up approach to navigate the options of Scopes 1-3 emissions.

Figure 1 shows some of the options available and elements of the roadmap that must take place in a joined-up approach to reach net-zero emissions.

Explore new territory

What got us here won't get us there. The only option is to change and change faster than ever before. Some unconventional thinking will be needed. We need to go outside our normal limits to significantly reduce Scope 1 and Scope 2 and will need to consider sources of low-carbon intensity electricity, hydrogen, other utilities, and CO2 sequestration. Some of the most exciting and emerging insights will be derived from the opportunities for emission reduction and energy optimisation between traditionally separate companies and industries co-operating in the future. Some, initial examples could be shared investment in carbon sequestration, or joint

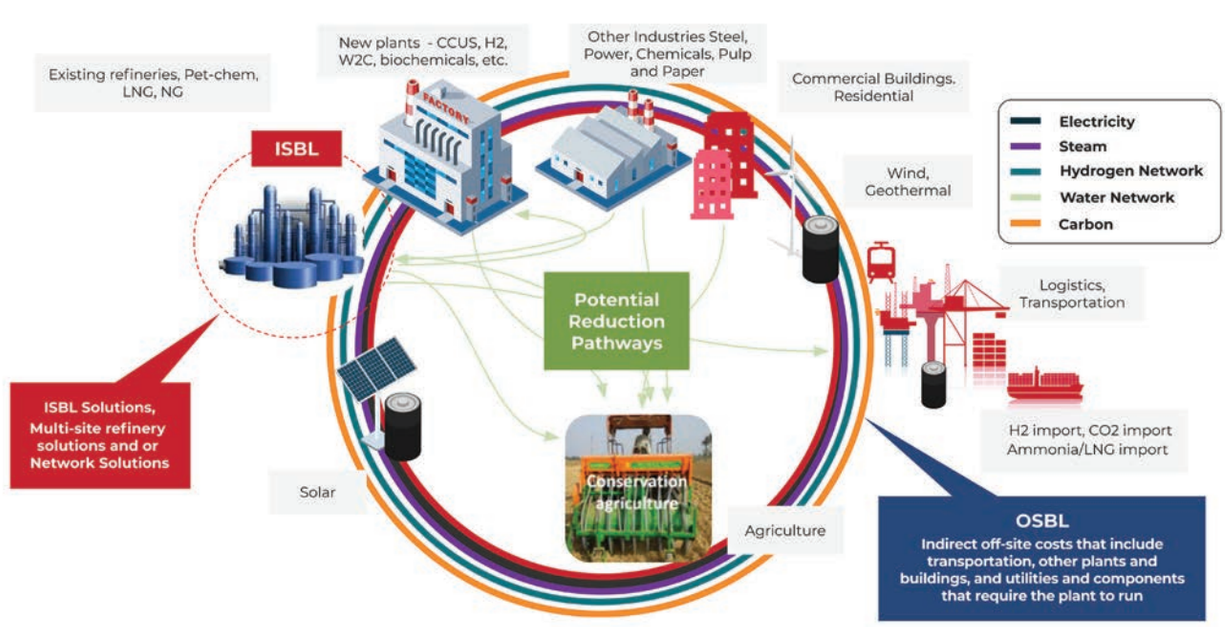

Figure 2: the industrial and local energy clusters of the future

#	Name	Main Product	Non CO_2 feeds
1	Methanation	Methane	H_2
2	Methanol	Methanol	H_2
3	Fischer-Tropsch	Syncrude / SAF	H_2
4	Oxo Synthesis	Butanal	Propylene, H_2
5	Carbonation	Building material	Steel slag
6	Xylenes	Mixed Xylenes	H_2
7	Urea	Urea	Ammonia (NH_3)
8	Polyols	Polyether carbonate polyol	Propylene oxide (PO)
9	Polymeric Carbonates	Polypropylene carbonate (PPC)	Propylene oxide

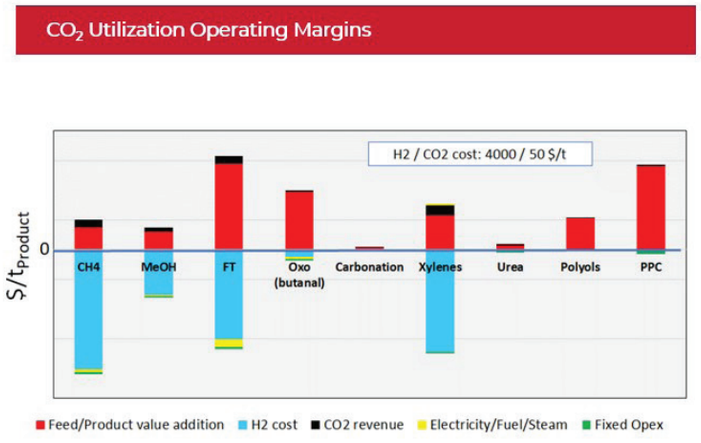

Figure 3: Carbon Dioxide uses, costs, and margins

development of low-carbon electricity or hydrogen by a cluster of co-located industries or even towns, cities, and residential estates. Our ultimate destination would be to design an industry network within which carbon is fully recycled, such as in Figure 2. Inside the Battery Limit (ISBL) refers to the area where the plant or the process plant and equipment are located while Outside the Battery Limit (OSBL) refers to the space outside the plant boundary and can affect the plant's operation. In the future, the line distinguishing the boundaries between ISBL and OSBL is expected to become more blurred and integrated. An oil and gas refinery or petrochemical complex will consist of many individual plants and units, integrated to outside utility plants, power generation units with shared process streams such as water, inter gases, hydrogen, ammonia, and steam. The shared infrastructure and emission reductions present a very large and exciting opportunity. The key to its success is more about new thinking, attitudes and execution than simply adopting novel technologies.

Bringing Decarbonization to Life™

To bring decarbonization to life, researchers show the operating margins must be understood today and in 10 years. For example, what is the cost and margin of CO2 use in industrial processes instead of emitting it? KBC has routinely looked and costed out nine potential carbon utilization technologies as shown in Figure 3.

The chart illustrates the operating margins associated with the various CU technologies based on the H2/CO2 price scenarios in 2030. Hydrogen, other utilities (electricity fuel, steam), and fixed operating costs are presented on the debit side, below the zero axis. In contrast, the revenue streams derived from the product/feed differential and CO2 utilisation are displayed as positive bars.

These economics may shift depending on the location, nearby industrial clusters, and potential for collaboration. This makes sense considering the Polyether Polyols Market size is forecast to reach USD $15 billion by 2025, and then grow at a CAGR of 5.5%.

Key take aways

A joined-up approach to reducing Scope 1-3 emissions is vital to successfully reaching net-zero emission objectives. Energy efficiency is a good start but can only go so far. Detailed modelling is required to thoroughly understand and rank the options available. Ultimately, significant reduction requires collaboration outside of the facility's battery limits. Significant Scope 1-3 reductions will require collaboration with new and existing industries, adoption of new technologies, and redesigning value chains.

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A synergy of Blue Hydrogen and LNG Regasification Plant : A Novel Approach

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Due to climate change, the recent natural devastations occurring throughout the globe is the utmost prioritized issue to combat by finding novel solutions. Fossil fuels are sources for acclimate change that needs to be curtailed up to a maximum extent. Replacing complete fossil fuels with green technologies in the near term is very challenging and it's also difficult to predict up to what extent this replacement is possible. However, integration of different processes and increasing efficiency of processes can reduce energy consumption and hence fossil fuel consumption.

Producing Blue H_2 from Syngas efficiently is indeed a costly affair. This is where Synergy of Blue H_2 & LNG Regasification plays a pivotal role in achieving this target in a cost-effective manner. The LNG regasification terminals are one of the major sources of natural gas supply for natural gas importing countries. These terminals have a considerable amount of unutilized cold energy that gets lost into the atmosphere while converting LNG to Regasified Natural gas. This source of cold energy can rather be utilized in a better way for Liquefying CO_2 from Syngas. The liquefied CO_2 can then be further disposed off in identified underground CO_2 storage reservoirs or can also be sold to liquid CO_2consumers.

Installation of SMR based Hydrogen Generation units near the LNG plants is not only advantageous in producing Blue H_2 effectively utilizing LNG plant cold energy, but also provides low carbon Hydrogen for consumers by directly selling Blue hydrogen as well as by using the Hydrogen for blending with natural gas at the source i.e. at the gas terminal itself.

Climate change: The emission levels are more than 49% higher than in the preindustrial area. The increased greenhouse gas emission is responsible for Global warming and climate change. Climate change is now a reality and it is impacting our lives. The primary routes to mitigate climate change are

a. Increase efficiency, and minimize loss of energy. Both of these actions will reduce the consumption of fossil fuel

b. CO_2 capture and Utilization or Storage.

c. Use of alternate sources of energy like wind, Solar, Biomass etc

LNG: Liquified Natural Gas is the liquified form of Natural gas which is predominantly methane. Natural gas is liquified for ease of transport from gas-rich countries. Huge volumes of gas are transported in the form of LNG and this LNG is again regasified to inject into the nation's gas distribution network.

At LNG regasification terminal, LNG is unloaded from LNG carrier ships to LNG storage tanks. The LNG from LNG storage tanks is pumped to LNG vaporizers where it is vaporized from ~-160 C to the pipeline gas temperature.

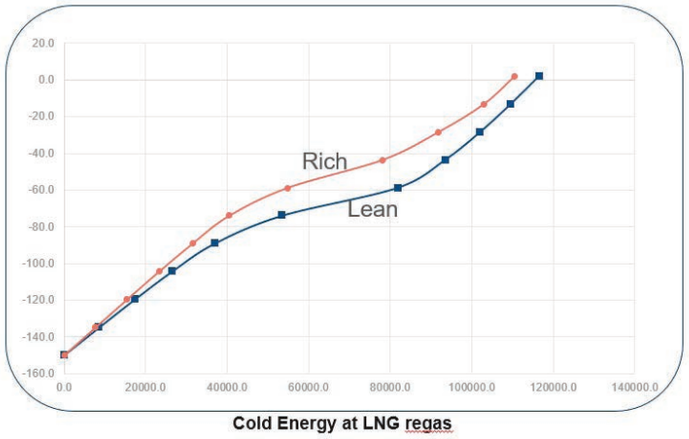

Figure 2: Cold Energy potential of LNG Regas Terminal

India imported 24 MT of LNG in 2020. The cold energy available at different temperature levels for a typical 5 MMTPA LNG regas terminal is shown in Figure 2. This figure shows cryogenic heat of more than 60 MW is available, which can be utilized for any cryogenic applications like CO2 liquefaction etc. In most of the LNG Regasification plants, Atmospheric air or seawater is used for the vaporization of LNG as heating media,

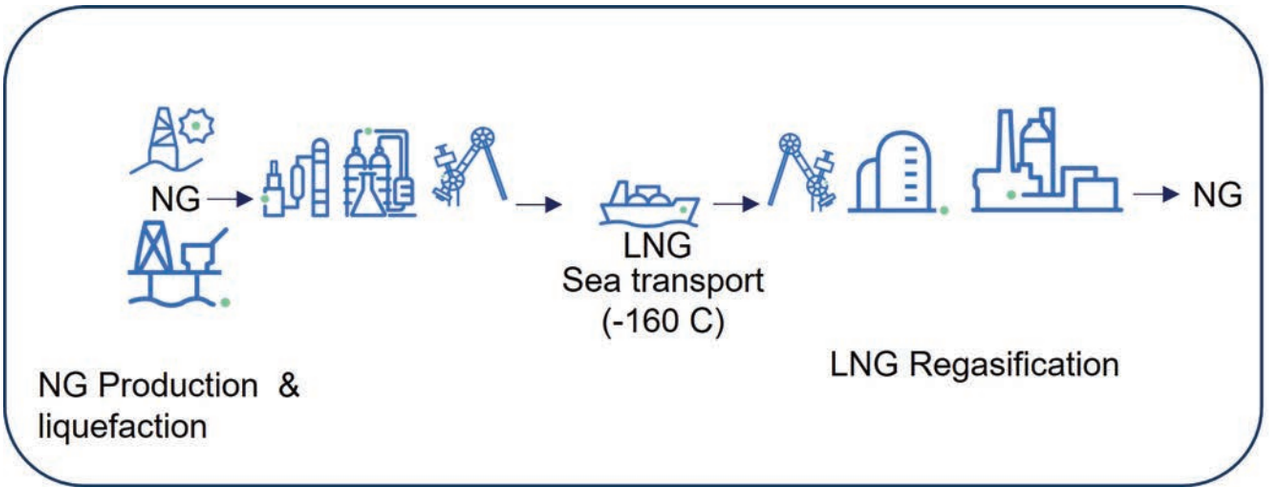

Figure 1 : Typical LNG supply chain

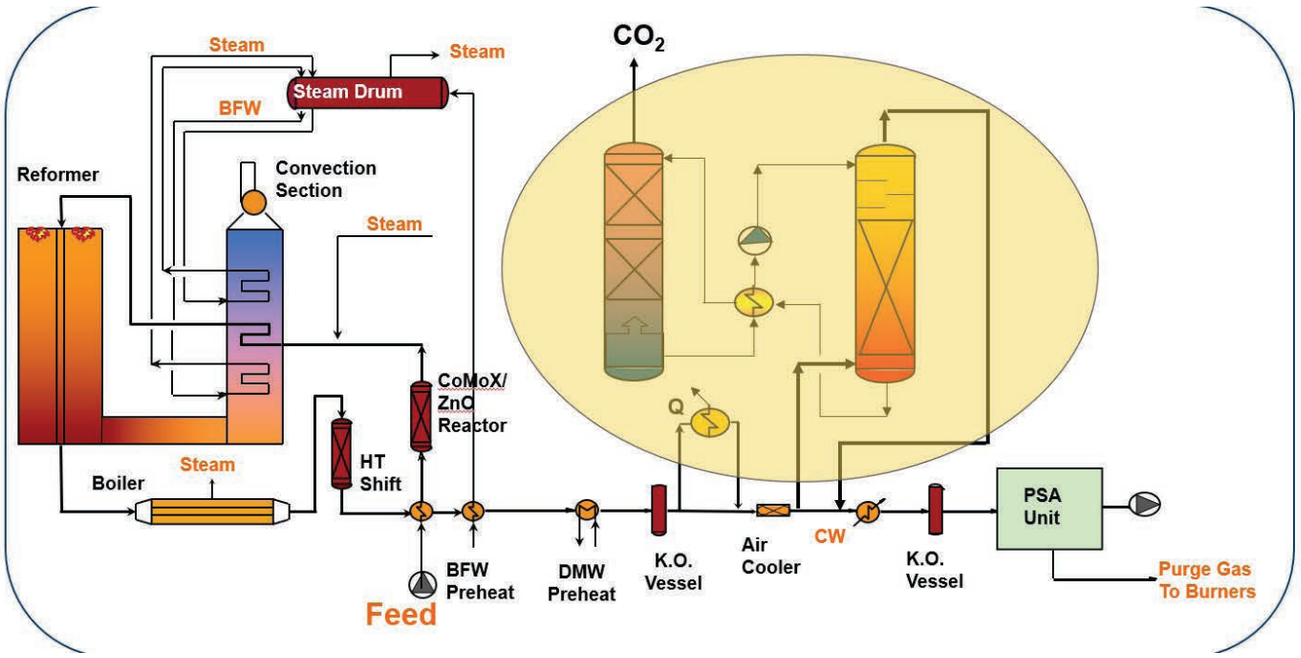

Figure 3 : SMR Hydrogen Generation plant with CO_2 capture

where this cold energy is wasted, as these are the most cost-effective options.

Another important aspect of LNG terminals is that these are major sources of Natural Gas gas supply to the gas grid. The decarbonization activities when started at the source itself then it can help in decarbonizing downstream sector also.

Considering all challenges of Hydrogen blending with 15% of NG are mitigated in near future, and H_2 gas blending is required to be done, for 5 MMTPA LNG plant the hydrogen needed for 15% blending will be 110 KTPA Hydrogen production.

Hydrogen Generation Plant : Hydrogen Generation plants are used for hydrogen production by Steam methane reforming of Natural Gas. These kinds of hydrogen plants are provided in all the Oil refineries for hydrogen production. A typical scheme of hydrogen generation using Steam Methane Reforming process is as below.

In the SMR Process reforming reaction of Natural gas with steam occurs and it produced Synthesis gas which is mixture of Hydrogen, Carbon Monoxide , Carbon dioxide and steam. This synthesis gas is further processed in the Shift reactor to produce more hydrogen by water gas shift reaction. Conventionally this Syngas is sent Pressure Swing Absorption (PSA) for purification for removing impurities like CO , CO_2 and high purity Hydorgen is produced. However, when CO_2 capture is intended additional step of CO_2 capture is added upstream of PSA for removal of CO_2 at high pressure, which is shown as encircled in Figure 3.

The captured CO_2 is fed to further treatment and utilization. Where the utilization is not possible the CO_2 liquefaction and transport for sequestration is done , while implementing CCUS.

It shall be noted that there are two sources of CO_2 in SMR hydrogen. The major part of CO_2 is from the process of hydrogen production as discussed above and the second part is CO_2 produced from the combustion of fuel. The process CO_2 is more than 70% of the total CO_2 produced from SMR hydrogen plant and easier to capture compared to the combustion CO_2. The total CO_2 produced is about 9 to 10 kg per kg of Hydrogen production.

The Hydrogen production using fossil fule but that avoids CO_2 emissions is called "Blue Hydrogen". Blue hydrogen is a low hanging fruit for the low emsission cleaner fuel Hydroegn. Also,now with adnavcements in technologies it is possible to produce hydrogen using Natural gas feed with less than 0.5 Ton CO_2 per Ton of Hydrogen production.

CO_2 capture have been a matured technology and is already proven in the industry. The challenges are coming for CO_2 evacuation i.e. CO_2 utilization and/or storage.

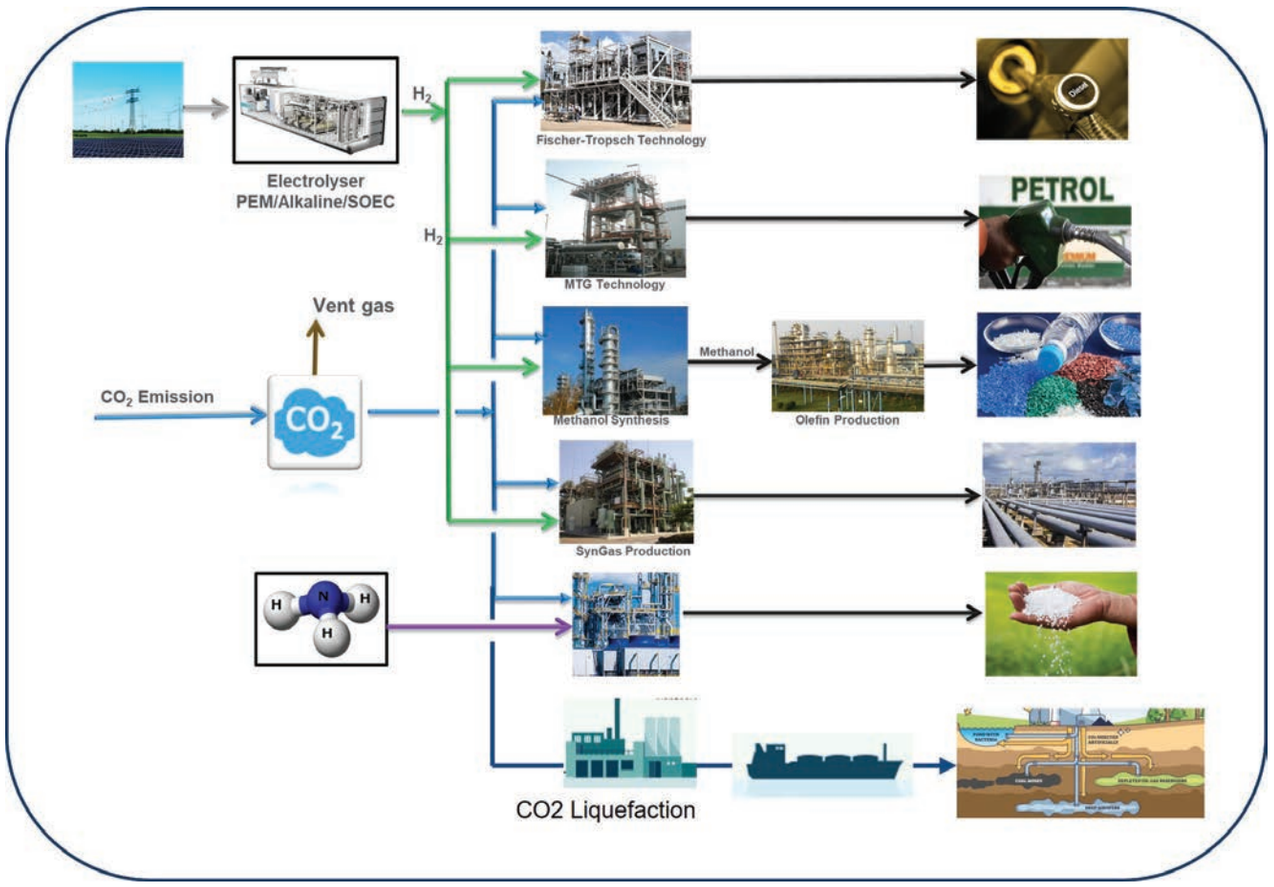

Figure 4 : CO_2 Utilization and Storage routes

CO_2 Utilization and/or: CO_2 utilization i.e. producing valuable products from CO_2 is most desirable, however, it might not be economical all the time. CO_2 can be converted to valuable liquids like synthetic fuels petrol, Methanol, urea, synthetic natural gas, Olefins etc. However, these need considerable CAPEX and OPEX.Along with the utilization CO_2, injection into the underground reservoirs is also being explored. The underground storage can be depleted oil and gas reserves, deep aquifers, or underground coal beds.

The CO_2 needs to be transported to the right consumer in an economical way. Liquefying CO_2 to reduce its volume so that higher amount of CO_2 can be transported using CO_2 carrying ships from marine ports to other marine port where CO_2 users like fertilizer plants can utilizer or CO_2 can be transported by ships to the deep CO_2 underground reserves for CO_2 sequestration purposes.

Integration of LNG cold duty and CO_2 liquefaction: The cold energy available in the LNG plant is more than sufficient for the liquefaction of CO_2 produced from the 110 KTPA Hydrogen production plant mentioned in the above section. T his hydrogen plant can consume about 10% of the available cooling duty for CO_2 liquefaction. Thus such integration not only saves power needed for CO_2 transport as well as it increases the efficiency of the LNG regasification unit.

With the government planning about CO_2 clusters and hubs in the future, if these CO_2 systems are integrated with LNG liquefaction plants, the cold energy of LNG can be efficiently used. This will serve a dual purpose one is saving the CO_2 refrigeration for CO_2 liquefaction and, the other is increasing the efficiency of LNG Regasification and hence reducing CO_2 emissions.

CONCLUSION

LNG Regas plant has a considerable amount of cold energy which can be utilized for CO_2 liquefaction for facilitating the transport of CO_2 efficiently. When SMR Based Hydrogen unit is installed in the vicinity of the LNG Regas plant, cold energy integration with the LNG plant reduces the cost of 'Blue hydrogen'.This Blue Hydrogen can be used for H_2 blending in pipelines or can be sold to nearby customers like steel-making plants. This approach not only contributes to the reduction of CO_2 emission from LNG plants due to increased efficiency but also reduced CO_2 emissions of the CO_2 liquefaction process. ■

"From an Element in periodic table, Hydrogen became the mission of my life"

Siddharth Mayur
Founder President
H2E Power Systems

Siddharth Mayur, Founder President of H2E Power Systems *found his calling in Hydrogen as he set off on the mission to solve his grandmother's constant problem of facing power outages. A pioneer in the field of Hydrogen Energy, he strongly advocates the need of upping the ante by setting up Hydrogen SEZs and indigenously manufacturing all 380 components of electrolyzers to realize the National Green Hydrogen Mission for the country by Making in India in true sense. In a candid interview with* ***Mittravinda Ranjan****, he shares insights into plan to set up 1 GW of manufacturing facility for all types of fuel cells, have 100,000 UrjaUdhyamis on ground doing last mile connectivity & plans for the*

What triggered you to venture into this space 13 years back when there was hardly any discussion about hydrogen as becoming a major source for energy?

Diwali of 2009 was a turning point in my life. I can still recall my grandmother's voice lamenting about the power outage in her village during the '*Festival of Lights*' and that she had no choice but to perform the rituals in candlelight. Power cuts were not something new to me but what irked me the most was the challenge the farmers, who toil so hard to put the food on our plates were facing just 30 km away from my place with 24X7 electricity. Somehow this thought stayed with me, and I kept thinking to find a way for '24 x 7 Clean, Green, Reliable & Affordable Energy for All.' This was more like wishful thinking as no one in the mankind had succeeded to put it all together, but I still thought this idea to be worth exploring which was the seed for my entrepreneurial journey in the energy industry.

Next two years were very busy as I went scouting for available options till, I came across fuel cell technology. Though these aligned well with all the parameters of clean, green & reliable, there was absolutely no infrastructure or ecosystem that could have facilitated nurturing this idea and there were no ready references which could have given me a cue to start. So, affordability question was out and the success of project seemed to be a far cry at that time, but there was definite hope that

the technology had lot of potential for cost reduction & with the Indian Jugad, this seemed very likely.

Further research led me to Fraunhofer Institute of Ceramic Technology (IKTS) in Dresden, Germany to have technology partnership. During our research on fuel cells, we found that on reversing the process, instead of using hydrocarbons as feed to produce electricity, heat & water, water and Carbon Dioxide could be used as the feed to produce syn-gas which is the building block for all downstream hydrocarbons like Kerosene, Methanol, High value Waxes etc.

Around this time, as a net importer of energy, India's energy bill stood at around US$ 130 to 140 billion. Although we did realise that introducing hydrogen in the primary energy mix could be a game changer for India. This thought was a 'Eureka Moment' when from an Element in the periodic table Hydrogen became the centre of my universe, a mission for me as the clean source of energy which could solve the energy issue for people and turn around India from net importer to an energy independent global energy exporter. My dream of Swadeshi Urja for a Swawalambi Bharat got its Hydrogen wings.

So how did you get your first breakthrough of setting up first commercial green hydrogen project?

Everyone wants to save the planet. I have heard people lecture about their concern for the environment and urgency to address climate change, but when it comes to investing in an innovation that is yet developing and cannot immediately fetch you return on investments, it is a big challenge to get the same people on board to write a commercial order even though they can, but they are not ready to!

Any new business idea is met with resistance by the investors who benchmark it with the other existing & available options. So, it was no surprise for us when the investors compared our quotation to develop hydrogen with solar that was picking up in India at that time. They were concerned about cost effectiveness (many still are), supply chain reliability, scalability etc which were actual impediments in implementation of the hydrogen ecosystem.

But as an entrepreneur you know when you are ready to run with the idea. So I and my wife Bhavana decided to use our personal savings as the seed fund for the cause of Hydrogen, way back in 2010 and my Partner and friend Amar joined in with his technical expertise. It was later in 2019 when I met Adar Poonawala, CEO, Serum Institute of India who was very supportive to the Climate Vision and joined us as an Investor & a Partner. There is a general notion about the PSUs in India as being very bureaucratic, conservative to accepting new ideas. I am glad to say that I was pleasantly surprised when I met the team at IndianOil R&D lead by Dr. S S V Ramakumar and later S C Mishra, CMD, Oil India Ltd, my mentors who believed in our start up ideas and gave us our commercial breakthroughs.

When I met S C Mishra, he liked the conviction of our start up and was ready to take the risk to implement the first green hydrogen pilot project. However this required us to go through public procurement process and we received the tender to build the demo unit. As we qualified the first step and overcame the daunting challenge, we had the herculean task to complete the pilot plant in less than 120 days. Yes, it was 120 days for us, and told my team about 100 days deadline and my team beat this deadline to deliver & commission India's first Commercial Green Hydrogen Project in 93 calendar days. Had it not been for S C Mishra, the board of OIL and the OIL India team's support, this project would have never taken off. I still recall his conviction & simple words *'I know you can do it'* which just energized every single

cell in my body then and will continue to inspire me all my life. Earlier in life, Indian Oil's Director R&D, Dr Ramakumar bet on us for the supply of a Hydrogen Forklift and developing a concept for providing independent Charging infrastructure for EV's based on a Fuel Cell, Solar & Battery hybrid system, which was delivered by our team and is now awaiting commercialisation. I am forever indebted to these two organisations for believing in an Indian StartUp & continuing to work with us to realise the NetZero goals set forth by our Honourable Prime Minister.

What are the gaps that need to be addressed in the short & long term, how are you preparing for India's green hydrogen story?

From the year 2020 onwards, hydrogen & fuel cell technology is getting lot of traction in India and most of the big boys in Indian energy sector have joined the bandwagon. However, the success of this initiative will require strong support and coordination from the Central & State Governments for implementation of these projects at multiple dimensions.

H2E Power Systems has the unique distinction of having complete ownership of intellectual properties for powder chemistry, electronics, and processes right up to the systems for Electrolysers & Fuel Cells. We are truly enthused to see the way our Government is driving the development of this future energy source and are well and are prepared to play pivotal role for our country to realise the National Green Hydrogen Mission.

With a big push to 'Make in India' in our hindsight, we are working simultaneously on setting up supply chains, manufacturing facilities for electrolysers & over 380 components that are required to build these electrolyzers alone. This will be essential in bringing down the cost of electrolyzers and nullifying Indian Energy sector's dependence on global scenario & supply chain disruptions thus increasing reliability & resilience in Indian Energy projects related to electrolyzers and hydrogen. Even if a single piece of equipment is outsourced, the entire value chain and supply chain will continue to rely on imports thus defeating the whole purpose of Atmanirbhar Bharat initiative. Now it is for the Government to create this kind of ecosystem that can be done through building Special Economic Zones to enable establishing Green Hydrogen Giga scale capacities.

Trained manpower is a cornerstone and India needs at least 50,000 trained engineers per year specializing in NetZero technologies who can & will take responsibility to implement these technologies at the ground level. Our education system needs complete overhaul as the institutions right from the schools, colleges and research need to align with the evolving trends so that students can understand & learn to innovate from a young age and get educated about implementing the technologies. At H2E Power Systems, we run '*UrjaUdhyami*' a 9 month training program for technicians to train and expose them to these technologies for services & maintenance as well as financial models to create Energy Entrepreneurs. We aim to develop 1, 00, 000 professionals by 2030, who will be able to serve up to 3, 00, 000 villages thus truly take this technology to the masses. Each one; Make one, will ensure that these 100,000 UrjaUdhyami's will help at least a million Indian's achieve Energy Independence & become NetZero.

With stabilization of supply chains, the cost of Green Technologies is coming down and there is significant improvement in last mile connectivity over the last couple of years. My observation is, with more work we can be energy independent before 2047 and to achieve this we should completely dedicate the next 10 years to solve the energy problems and then target becoming Net Zero before 2070.

How do we prepare to address the challenges in Hydrogen storage & transportation?

We are absolutely not prepared. Our reliance is near 100% on imports which makes us totally dependent on Europe for all Hydrogen storage solutions at present. Although some prominent institutions and corporates are working to develop indigenous solutions like IndianOil R&D is developing Carbon Fibre cylinders, IIT Bombay is working on solid state hydrogen storage, our sister concern Ohm CleanTech is working on LOHC solutions that was awarded to them through start-up program of Oil India and so is National Chemical Lab, Pune. However, this will require a lot more effort as well as patient investments to find sustainable solutions.

Ammonia & Methanol have always been the easier ways for hydrogen transportation. At H2E we have made remarkable strides for producing hydrogen using all the 4 type of electrolysers viz. Alkaline, PEM, AEM & Solid Oxide industrialising these technologies and making them ready for mass production in India. Currently our research team is exploring alternate routes to produce methanol & SAF via co-electrolysis using SOEC. Industrial emissions can be captured and at single step Co-electrolysed to produce CO and H2 that become building block for any hydrocarbon. We can produce Ammonia & E- kerosene, a sustainable aviation fuel that will be important energy carriers in the future. Methanol does not require specialised equipment and can be transported in normal tanks. These are transient technologies that will be in use till the time solid state

storage of hydrogen or LOHC is developed. Parallelly, India will need 15–20-year long program to develop Hydrogen pipeline infrastructure by 2045 just like how the country has developed cross country natural gas lines network.

Which are some of the major Hydrogen pipeline infrastructure projects on the horizon?

European Union is envisaging to invest close to 150 billion Euros to establish the hydrogen pipeline network across EU nations & considering buying or produce H2 in bulk from North African countries or in Spain & transport H2 through pipe to the mainland. Post approval, the completion of project could take somewhere between 10-15 years. EU has taken cognizance of energy supply disruptions due to Russian war on Ukraine and is trying to diversify the energy import basket for risk mitigation. Other than hoping to produce hydrogen in Morocco, Libya or Namibia, the EU is looking to broaden the supplier network for hydrogen & ammonia across 10 countries. In my view, India can easily leverage this opportunity for short term profits through ammonia exports and look at future long-term supplies.

Tell us about some of the key projects in India & globally to stimulate the use of hydrogen for domestic applications.

In India, many corporates & research institutions are trying to develop hydrogen & natural gas mix models. We are working with IIT Guwahati and researching on the different mix percentages of 2, 5, 10 & 15 which will be followed by installation fuel cells at homes to produce heat & electricity and for applications in Oil & Gas industry. GAIL is pursuing a pilot project in Indore on gas blending in CGD network, a lot of private companies like Torrent are working on developing demonstrator projects on blending Green Hydrogen in their CGD networks. These are low pressure pipelines and can tolerate up to 18% of hydrogen, which is corrosive in nature. After determination of mix percentage, fuel cells can be installed, and many homes can be taken off the grid. Japan is a very good example where they have taken half a million homes off the grid.

We are working on pilot project to take 100- 200 homes off the grid. This project will have 5% H2 and 95% natural gas in the pipeline connected to the fuel cells which will convert this into heat & electricity thus taking them completely off the grid. Taking homes off the grid will have a huge increase in efficiency as house will consume only the energy it needs thus reducing the impact on power plants which will not have to run at maximum capacities all the time This will reduce the energy costs by almost 20-25% in long run and will definitely save the transmission & distribution losses. We have spoken to the Ministry in this regard and appraised them on our idea.

H2E is also a part of PACE project consortium in Europe, which is working towards powering almost 10, 00,000 homes with Fuel Cell based micro co-generators. UK is working on heat pump & fuel cell combined work for heating & electrical needs.

Another very progressive initiative is the Hydrogen Valley project in Netherlands where in phase 1 of this pilot a community of 50 to 100 homes will be supplied hydrogen energy to meet the heat & electricity requirements to completely take them off the grid. This is still at experimental stage to understand complete reliance on hydrogen as the energy source and to have dedicated H2 pipelines over the next 10-15 years.

Having said this, hydrogen alone will not work in the long run. Synergistic efforts are needed to move forward from fossil fuels as the cheapest source and develop hydrogen & combination of new technologies as the affordable energy sources to address the challenge of decarbonisation and meeting the Net Zero goals.

What are your future plans?

We are highly focused on organic growth to build strong foundation and ecosystem. By the end of 2023, we will start to manufacture some of the electrolysers and a few key components in India and over the next few years we will scale it up to a Gigawatt capacity. In the next five years, we have planned outlay of INR 500 crore to build manufacturing facilities, infrastructure and supply chains in India first and then globally. In the next seven years we plan to have 100,000 UrjaUdhyamis on ground doing last mile connectivity, set up 1 GW of manufacturing facility for all types of fuel cells. Globally, we see lot of potential for us in the Middle East, Africa & Southeast Asia, but at present we are all about making Green Hydrogen happen in India.

H2E is working towards building the legacy & aspires to be a unicorn serving 1 billion customers, not just a unicorn with a billion $ valuation by offering – '24 x 7 Clean, Green, Reliable & Affordable Energy for All.' ■

Testimonials

Refining & Petro CHEMICALS 2023

SURFACE ENGINEERING & Corrosion Control World Expo 2023

The Chemtech Team organized a splendid integrated energy exhibition from March 1-3, 2023 in Mumbai that was a unique combination of a knowledge platform and a vast networking platform. The organizing team made extensive arrangements to host a huge gathering from diverse fields of work, and despite the large magnitude of the event, everything was very orderly. The ONGC family delegates immensely benefitted from this show. The conference provided an excellent platform for the exchange of innovative ideas and profound insights on Decarbonization in the oil and gas industry, as well as Surface engineering and Corrosion control. It was my privilege and pleasure to interact with such a diverse and engaged audience that included key decision-makers and subject matter experts from the energy industry. I look forward to participating in future conferences organized by the Chemtech team.

C Mathavan
ED-Asset Manager, Mumbai High Asset
ONGC Ltd.

"It was an excellent event for professionals coming together to explore current and future priorities for Refining& Petrochemical industry in the challenging areas of de-carbonization, fuel substitution and value maximization. The key-note speakers and panel teams gave an excellent overview of path ahead. The exhibitions were exemplary, showcasing massive developments in the industry. It was an excellent networking platform enabling further collaboration beyond the event!! Thanks for inviting me as the Speaker in the event."

Ravikumar Vemuri
CTS Refining Vertical Head, Reliance Industries Ltd.

"It was an excellent conference where various pertinent topics were deliberated. Student Outreach Program was a unique initiative. I thank the organizers and wish all the best for future endeavors."

Soma Chattopadhyay
General Manager (Technical), IndianOil

"The event was very well organized and represented. Topics chosen were very appropriate addressing the need of the hour and the panel discussion well organized. Stalls had very good participation of oil & gas industry. In fact I sent my Graduate Trainees to the event for a day to learn about the various products and interact with supplier and they found it to be very useful."

Davendra Singh
Director, Mumbai Operating Center , Technip Energies

"As a speaker it was wonderful to share the details on what we have done on the front of reliability and digitalization. Also, as an audience it was great to listen to the industry leaders when they shared their visions, approaches and ideas which were thought provoking. The exhibitors were able to convey that service providers and technology providers are there to match the progress of the industries and they can help the industries in resolving the issues which are being faced on various fields. Overall a great place and a great environment. Kudos to the organizers. "

Manish Pande
Chief Manager - Bina Refinery, BPCL

"Chemtech - Oil Gas & Power World Expo just concluded its splendid 2023 event. It is an event which is on a constant growth path year on year in both coverage and depth in the domains it captures. In oil and gas especially, with the content of the conferences carefully curated, this year's event was truly engaging with exciting sessions and insightful discussions. It has been an honour for me to once again be a speaker in this event and share thoughts amongst leaders, experts and very inquisitive participants. This year's event also had a far greater participation from across the globe, varied and huge spectrum of exhibits making it an event not be missed. Indeed it's a flagship event to look forward to next year."

Purandar Chakraborty
Head - Innovation, Alternate Energy & ESG, Nayara Energy

"The conference was a unique blend of energy sector as a whole and very active participation from all top energy majors here made it truly worth attending. The student section is also growing in popularity and it was great to witness industry veterans taking time out to talk to gen next and preparing them for a bright future .Looking forward to the 2024 milestone confernce of hitting the half century !!!"

Sathyapal Nair
Country Manager, Winn & Coales (Denso) Ltd

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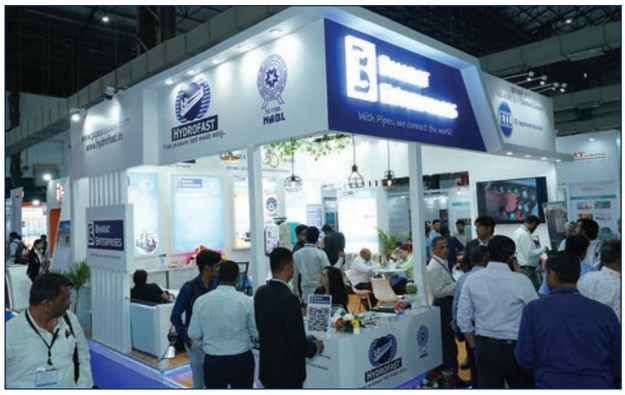

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VEGA India Level and Pressure Measurement Pvt. Ltd. is a wholly owned subsidiary of VEGA Grieshaber KG, which is the world's leading supplier of level, switching and pressure instruments. VEGA, since its inception in the year 1959 in the Black Forest area of Schiltach, Germany has been focusing on the level and pressure measurement gauges keeping the focus on customer's needs to provide simple solutions to their complex requirements. In the area of radar level measurement, VEGA has been a pioneer in setting trend worldwide for over a decade now. VEGA is the largest of the three partner companies in the Grieshaber Group. The other two companies being Grieshaber Precision and Supfina, which manufacture precision parts and special engineering products respectively. VEGA serves industries employing local instrumentation specialists to ensure the tradition of VEGA SERVICE to its customers throughout the world. Traits like Reliability, Honesty, Humanity, Straightforwardness and Creativity help us to instil trust within our customers. VEGA Grieshaber KG is present in more than 70 countries through various subsidiaries as well as sales partners.

Industries We Cater

- Water and Wastewater
- Pharmaceutical
- Food & Beverages
- Chemical
- Energy
- Building Material
- Oil and Gas Offshore
- Mining and Metal Processing
- Paper Industry
- Refining and Petrochemical
- Ship and Yacht building
- Environment and Recycling
- Cement Industry

For more than 2 decades VEGA was operating in an Indian market through sales partners, the last association being with WIKA Instruments India. However, sensing the great business opportunity that Indian markets offer, VEGA formed VEGA India Level and Pressure Measurement Pvt. Ltd. In May 2011. In the year 2017, VEGA India established a well-equipped manufacturing facility in Pune, Maharashtra. We offer IEC-Ex certified products. We are also ISO 9001, ISO 14001 and ISO 45001 certified organization.

VEGA India is responsible for the manufacturing, marketing, sales and servicing of all the VEGA instruments that are offered in the domestic market. Team VEGA India comprises technically and commercially competent professionals with outstanding knowledge regarding the applications of level and pressure instruments in various industries. We, team VEGA India, are in a position to live up to the global standards of the VEGA Grieshaber group and cater to our domestic clients with the same rigour. Our internal service team also adopts the global 'VEGA Service' parameters to offer hassle-free operations. With our quality level and pressure measurement instruments, we offer products that excel in performance and help in the process optimization. Our technology is backed up with the extensive industry experience gained in the last six decades, and hence apt across industries.

Product Portfolio to optimize processes:

Continuous Level Measurement

- Radar
- Guided Wave Radar (GWR)
- Ultrasonic
- Capacitive
- Hydrostatic

Point Level Detection

- Vibration
- Capacitive
- Radar
- Conductive

Pressure Measurement

- Process Pressure
- Hydrostatic
- Differential Pressure

Flow Measurement : Differential Pressure

Density Measurement

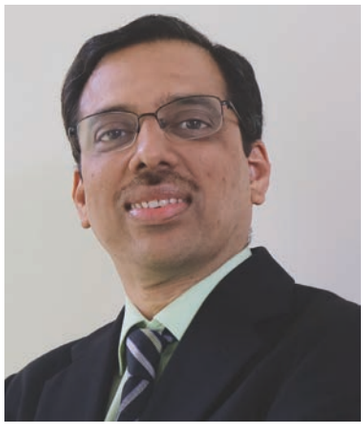
- Differential Pressure , Hydrostatic

Radiometric Instruments

- Continuous Level
- Density Measurement
- Flow Measurement ■

https://www.vega.com/en-in

"India can leapfrog into a sustainable future, but we must act now"



Venkatesh R
Managing Director & Director Energy Business
Wartsila, India

Rapid acceleration of global decarbonisation efforts has presented an unprecedented opportunity for Indian Energy and Power Companies to expand the business into new avenues. ***Venkatesh R, Managing Director & Director Energy Business, Wartsila, India*** *points out flexibility through energy storage is the key to achieve the cost-optimal renewable baseload system to shift excess power to times of deficit in availability. He discusses the challenges to create net zero power systems& shares insights into some of the novel pathways & technologies to decarbonize.*

What would be the best suited pathway for the Indian energy sector to accomplish their share of India's 2070 Carbon Neutrality goals?

India has set a target of installing a non-fossil energy capacity of 500 GW by 2030. The rapid acceleration of global decarbonisation efforts has presented an unprecedented opportunity for Indian Energy and Power companies to expand the business into new avenues, experiment with emerging fuel sources, and prioritise sector-specific innovations in technology and lifecycle solutions. Wartsila Energy has conducted power system modelling that provides a clear roadmap for decarbonisation and reaching net zero power systems by:

- Adding renewables
- Adding flexibility through balancing engines and energy storage

- Phasing out inflexible fossil fuel plants such as coal and CCGT's
- Converting balancing engines to run on sustainable fuels
- Phasing out fossil fuels

Flexibility through energy storage is the key to achieve the cost-optimal renewable baseload system to shift excess power to times when renewables are not available, during evening or night-time. Balancing engine power plants must also be deployed to manage sudden surges in demand or drops in renewable generation. India certainly has challenges ahead in reconfiguring its power system for net zero, however it is possible with technologies that are already available at scale. With the right vision and planning, India can leapfrog into a sustainable future, but we must act now.

What are the key challenges that will be materializing in Indian context with increased up-take of renewables in the primary power mix?

The pandemic has changed the world to adapt to new methods at a rapid pace. Business processes have undergone a paradigm shift from their traditional mould to a digital landscape. Several sectors have shifted to work-from-home options in order to create a safe environment. Customer requirements to continue to run the power plants safely and smoothly even during the toughest of times has become much more essential.

We have seen that our customers' businesses have been impacted by the pandemic. However, recent economic indicators of the country suggest a revival is already underway. The two main challenges we see facing the Indian power sector are fuel security concerns and financial health of distribution companies (DISCOMS).

As an organisation, we have a very robust strategy and vision that will prevail even after the pandemic and in the future: we will continue leading the way towards a 100% renewable energy future. We see that the energy transition gives us an enormous opportunity, and with our flexible technologies comprising balancing gas engines, energy storage and energy management systems, we see a great potential for growth. We will continue working closely with our customers every step of the way, helping them find their optimal path towards renewable energy systems.

In fact, the pandemic has actually sped up the transition towards green energy. What we have seen in developed countries is that the generation of electricity overall went down, and the share of renewables increased.

What are some of the novel technologies required for enabling a sustainable energy transition journey?

The emergence of renewable energy has revolutionised world markets, and renewables-driven change continues with unprecedented speed. Even several years ago, few would have guessed the scope of the new technologies that have been developed to help countries begin the process of decarbonising their economies. Here's a look at five of the most important trends and technologies in renewable energy — some have radically re-shaped the energy market over the last decade, while others are set to make waves in the years to come.

Wind and solar: It is wind turbines and solar panels that represent, for most people, the onward march of renewable energy. Renewable energy is expected to make up 30 percent of the world's energy by 2024, according to the International Energy Agency, and most of this is driven by solar and wind projects that continue to be rolled out at a startling pace. This is a growth in the use of solar panels, which made up 60 percent of the renewable energy capacity installed in 2019.

Electrification: There will be new uses for electricity, including the production of hydrogen from water via electrolysis, recycling carbon dioxide by capturing it from the air, while nitrogen for fertilisers will also be made by taking it from the air. Eventually, electricity demand could increase as much as 3-4 times and the price will fall (thanks to the boom in renewable power). Switching to electricity is key to achieving the decarbonisation of economies, but there are other, less obvious, knock-on benefits including improved energy security (independence from fossil fuel exporters) and better urban air quality.

Power-to-X: Power-to-X is an umbrella term that covers different processes that turn electricity into heat, hydrogen, or renewable synthetic fuels. It offers a significant opportunity to speed up the shift to renewables by ramping up synthetic fuel production, and rapidly reducing fossil fuel emissions in sectors ranging from the steel industry and food production to the chemical industry and fertilisers. Technology can also play a key role in solving long-term energy storage challenges, regulating the ups and downs in supply from renewable sources.

Distributed Generation: A quiet revolution in the field of renewables is the increasing affordability and popularity of distributed generation. This means local power generation either in the retail or commercial sector: from solar panels on private homes to factories using combined heat and power systems. There are numerous advantages to the scaling up of distributed generation, from reducing reliance on centralised power sources to increasing grid reliability and making small-scale renewable power sources viable. When combined with smart grids, which are regulated by computers to fine-tune transmission, distributed generation is even more effective.

Energy storage: The potential of energy storage to accelerate the shift to renewables seems to be key in the years to come. Energy storage will be needed in the power system due to variable wind and solar production. There are multiple energy storage technologies. Some of the solutions that are likely to expand in the coming years include hydro-reservoirs, batteries, Power-to-X fuels, and seasonal thermal energy storage. These same technologies will also be useful for countries with large nuclear power industries. Above all, energy storage allows an efficient flow of power to be maintained despite the intermittent nature of wind or solar sources.

How would AI & ML based data driven modelling tools assist towards real-time decision making in the energy transition journey?

Innovative AI technology is transforming how energy is produced, stored, distributed, and consumed.

Machine learning is the process when a computer system uses data to progressively improve the performance of a specific task and thereby become 'intelligent.' Then, actions can be automated based on certain conditions or pattern recognition which can also anticipate future conditions. The energy industry uses this technology in a variety of applications, such as optimising production in oil and gas fields, generating compliance reports, and making predictions.

Renewable energy is becoming more important, but calm and cloudy days mean less solar and wind energy is generated. Machine learning helps predict more accurately and manage fluctuations in demand and supply, making the whole power system more efficient. It is also being used to lower energy consumption. Both AI and ML will be key elements for the design of future energy systems, supporting the growth of smart grids and improving the efficiency of power generation, along with the interaction among electricity customers and utilities.

Some of the future proof- agile & adaptable energy technologies that are in the development pipeline of Wartsila Corporation which can be deployed in Indian Energy Transition?

Wartsila's strategy is to introduce solutions which are compatible with all types of future fuels. We recently inaugurated our Sustainable Technology Hub (STH), which incorporates under one roof, the R&D, the Testing and Production of the new generation of engines. We design and build our engines to be flexible and future-proof to be capable of running on future fuel. The facility is in the process of experimenting with several emerging future fuels like ammonia, blended hydrogen, green hydrogen, methanol and more. We have seen significant breakthroughs.

Wartsila is focused on developing hydrogen power plant solutions, by having an engine and plant concept for pure hydrogen operation ready by 2025. In October 2022, we completed the tests for Wartsila's engine that has proven that it is capable of continuously supplying power to the grid at engine loads in excess of 95% using hydrogen fuel blend. This was a landmark achievement.

We are exploring the potential of this technology as we focus on providing customers with affordable, reliable, and clean energy. With the expansion of sustainable fuels, Wartsila is targeting to become carbon neutral in its own operations by 2030.

From the global experience of Wartsila Corporation, what are the key insights that you would like to share with Indian Energy sector?

In the current scenario renewables are challenging thermal. The Indian government has ambitious targets for renewables. Coal usage will be reduced in times to come but some coal capacity will remain in the power system as solar, and wind cannot be available all the time. More focus is required on renewables, a clear policy on batteries for Renewable Energy with the exception for solar energy. Earlier, there were power shortages, but now that India has achieved near adequacy, there is a need to focus on reliable power. Battery manufacturing will play a crucial role going ahead.

We are in discussion with various States, utilities, and regulators regarding the role that renewables can play in meeting future electricity needs and strategies to efficiently integrate renewables in the grid. The industry should holistically look at the net cost of the power system and not just at the variable cost.

Wartsila continues to lead the way towards a 100% renewable energy future. Each country, city and company have their own transition path, and we are working together with our partners to create fact-based proposals that utilities and customers can benefit from and use in their own transition planning.

What are the future plans- investments, projects, expansion of portfolio of Wartsila Corporation in India?

It is important to actively invest in flexible capacity such as balancing power plants and battery energy storage to utilise all the power generated from wind and solar power sources and avoid curtailment. Investing in renewables as stand-alone resources is not the right way to go, rather, investing in both renewables and flexible solutions will be the way forward. There is a need to take a holistic view of decarbonising the power systems and create an optimal path to make it happen. Wartsila will continue investing in solutions that are future-proof, taking us closer to a renewable energy future.

Our multi-product state-of-the-art factory at Khopoli, Maharashtra, manufactures auxiliaries' modules and reconditions and upgrades engines, ship propellers and components. We will be looking at how to utilise the factory for enhancing our business in line with Make in India and make Wartsila more competitive. We are looking at how we can indigenise more, with high quality products. That is a part of the strategy.

Wartsila has already delivered around 250 power plants to India with total output of over 3,500 MW. We take care of the operation and management on behalf of our customers in over 35 power plants with a total output of over 1,300 MW in India. Amongst the projects underway, there are couple of them in North-East India, which are significant. We have supplied a 70 MW Power plant to Assam Power Generation Corporation Ltd. This includes seven Wartsila 34SG engines running on natural gas.

Another one is our recent 30 MW engine power plant for Oil India, a premier Indian National Oil Company, which will be delivered under a full engineering, procurement, and construction contract. We won this project through the International Competitive Bidding Process.

Globally, our track record comprises 74 GW of power plant capacity and more than 80 energy storage systems delivered to 180 countries around the world. ■

A case study on low-cost bidding in an Oil Gas & EPC contract

Rashid Hussain
Advisor & Executive Director
3C Corporate Consulting Contracting

The Expert summarizes project estimate versus actual rates received from bidders. All the bidders are lower than company estimates by 31% to 51% which ultimately provokes a Low-Ball Bid from all the submitted bidders. As the management want to proceed ahead with procurement & execution of the contract, it has been a challenge for tender receive team to analyses, negotiate and provide best recommendations with proper depictions, best practices followed in awarding the Contract to the technically best and least cost contractor to accomplish Company's objectives.

Background to Scope of Work

This is an example of a pure community construction project in Oil & Gas Company facilities. A qualified and evaluated Contractor wins a bid to build a town two lane road. The external Consulting Company (comprising of Architects / Engineers) provided all the information and details pertaining to scope of work comprising of engineering, drawings, design, and specifications. The Contractor's responsibility is to build a road that includes all construction from site set up to closeout.

Further, this project's scope is to install a 1400-foot-long two-lane road with drainage pipe connecting two existing town roads. The scope includes all excavation, procurement of all materials, installation of all base materials, roadway, drainage pipe, catch basins to connect to existing town system, and clean up and seeding of shoulder areas. Figure 0.1 is sketch of the scope of work of winning contractor. The duration of project is 12 months and Contract Award is 2 months before the start of the Construction.

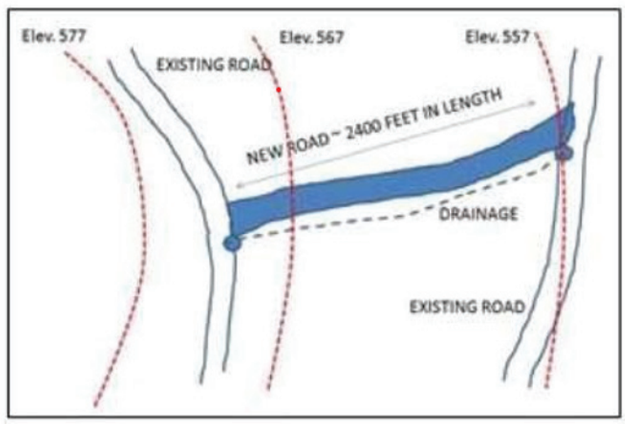


Figure-1

MEMO

To: Tender Committee (TC) Date: xx/xx/xxxx

Subject: Tender No. XXXXXX - "Construction of a Town Two Lane Road – Awarding Recommendations" (Company Estimate is US$230,000/-)

TC in its meeting No. xxx had concurred the price opening of following six technically qualified bidders:

AAAA
BBBB
CCCC
DDDD
EEEE
FFFF

Project Estimate

The approved baseline budget allocated to the project is USD 230,000/- It includes the direct and indirect labor costs, material and equipment costs, and management reserves.

In addition, the Company's engineering, Construction Manager & Financial Analyst teams have made the breakdowns of the budget by using available scope information, order of magnitude estimates, and experience for direct construction, subcontracts, management, and indirect by taking the contract value apart.

Further, spreadsheet items (completed project cost estimate) from similar previous works completed in other town was also considered for comparative analysis to prepare Company's Cost Estimate prior to inclusion

Suggested Awarding Criteria

From the evaluation results it is evident that the lowest bidder-L1 (AAAA) is 51% lower than the Company Estimate which is abnormally low. The Company's Contracting Manual specifies:

If the lowest bid is very less than the cost estimation, for example 30% less, then the said commercial bid of the bidder (to cover its normal costs and profit) shall be considered as "Low-Ball Bid". An exceptionally low

Name of Bidder	Bidding Price (USD)	+/-(%) vs. Est. Cost
AAA	113,000.00	-51%
BBB	119,500.00	-48%
CCC	125,500.00	-45%
DDD	145,000.00	-37%
EEE	155,500.00	-32%
FFF	158,750.00	-31%

bid is not necessarily a "low-ball" bid if it is based on or due to an estimating or arithmetical error by the bidder, or where it is due to the bidder's superior technology, operational efficiency, pre- existing state of mobilization, advanced or complete amortization of its equipment, or other reasonable expectations of cost reductions.

If the Tender Review Team suspects that a bidder has submitted a "low-ball" bid, discussions should be held with the bidder to determine the reasons for the low bid. The discussions should be aimed to systematically analyze the bidder's proposal to establish that the bidder:

- understands the scope of work
- can justify his proposed method of accomplishing the work; and
- can perform the work for the quoted price.

(d) Submit and provide presentation to Company on The Construction Execution Plan which should include overall program for execution, administration,

and control of the project, and contains specific administrative procedures defining interface activity between the Contractor and Company. Organizationally, the Construction Execution Plan should identify:

- Responsibilities for specific work (Project Plan)
- Organizational interfaces between all project parties
- Guidelines for conducting business between the contracting parties
- Process and procedures used in performing the work
- Development of Scope
- Construction Approach – direct hire and/or subcontracted labor
- Labor sources
- Site Administration (administrative, time keeping, billing)
- Materials management
- Procurement (who performs, process)
- Subcontracts (who performs, process)
- Project Controls (schedules, change control, estimates)
- Quality
- Safety
- Site rules and expectations

This should include a complete analysis of the cost breakdown to determine where the bid is insufficient If the TRT determines the bid is indeed a "low-ball" bid, the TRT shall either:

(a) recommend rejection of the lowest bid or award of the contract to another bidder. The recommendation must be supported by a written justification signed by the concerned Executive Director

OR

(b) require the bidder to sign the confirmation of acceptance of low-ball bid letter, as per the Low-Ball Bid. Rejection of a low bid will only be approved in extraordinary circumstances. It must be supported by reasons justifying why acceptance of the low bid is not in the best interest of Company. The cost breakdown analysis required by the Bid Review Program must also be included in the recommendation for the rejection of the bid.

Not a "Low-Ball" Bid when the lowest bid in comparison with other bids or the Cost Estimation is found to be not a Low-Ball Bid, the TRT shall prepare a written justification explaining why such lowest bid shall not be considered a Low-Ball Bid. It may be possible that the justifications show the mistakes in calculating the Cost Estimation such as over estimation, changes in the market situation from the time when such Cost Estimation was prepared etc. The justification shall be signed by all the members of Tender Review Team, concurred by the Managers of Proponent Department and Contracts Department, and approved by the proponent Executive Director. Only after preparation of such justification shall the TRT propose to award the contract to such lowest bidder.

Performance Bond

In assurance of the proper performance of the Service pursuant to the provisions of the Contract, the Contractor shall furnish the Company, upon commencement of performance of the Service pursuant to the applicable provisions, with an irrevocable bank guarantee as set out in the Contract Agreement ("Performance Bond") in an amount of USD 00,000.00 (USD xxxxxxxxxxx Only) which is equivalent to ten percent (10%) of the Contract Amount.

The Company shall have the right to offset from the proceeds of the realization of the Performance Bond any amounts of money, which were incurred by the Company in regard to or in connection with any remedial action taken against the Contractor for his defective or deficient performance of the Contract including, but without limitation, the amount of penalty to be applied for any delayed Work as stipulated in the Contract and also such costs and expenses as may be incurred by the Company on account of termination of this Contract by the Contractor's default pursuant to Termination articles of Contract Agreement.

The Performance Bond shall be kept valid from the date of issuance thereof until three (3) months after the expiry of the Time of Completion.

LOW-BALL BID LETTER

Company AAA

Sub: Tender No. XXXXXX - "Construction of a Town Two Lane Road –Low Ball Bid Letter

Please refer to your bid submitted for the above-mentioned Tender.

Our Company XXXX considers your bid to be substantially low in relation to the Contractor's Scope of Work. By this letter, you acknowledge and represent that you have clearly understood the Scope of Work covered by the reference Tender and you are fully prepared to perform the Contract Obligations in strict compliance with the Contract Terms and Conditions.

Further, you are requested to acknowledge and confirm:
Understanding Scope of Work under above tender
justify your proposed method of accomplishing the work
your confirmation that you can perform the work for the quoted price.
Submit and provide presentation to Company on The Construction Execution Plan which should include overall program for execution, administration, and control of the project as per details:

- Responsibilities for specific work (Project Plan)
- Organizational interfaces between all project parties
- Guidelines for conducting business between the contracting parties

- Development of Scope
- Construction Approach – direct hire and/or subcontracted labor
- Labor sources
- Site Administration (administrative, time keeping, billing)
- Materials management
- Procurement (who performs, process)
- Subcontracts (who performs, process)
- Project Controls (schedules, change control, estimates)
- Company's QMS Plan
- Company's Safety Plan
- Site rules and expectations
- Confirm and Sign on Company's this No-ball letter

Moreover, it is clearly understood and acknowledged by you that, should you be awarded the subject Tender, Our Company XXXX will not entertain any claims for additional compensation due solely to lack of profit or even overall loss unless Company XXXX has directed you to perform additional work outside the Scope of Work as set forth in the Contract.

Very truly yours,

Understood and Agreed By:
For:
Dated:

Mobilization Completion, Work Commencement Date and Time for Completion

The Contractor shall commence the Work on xxxxxx (Work Commencement Date) and shall complete the whole Work, securing the Company's acceptance pursuant to the applicable provisions of the Contract within twelve (12) months from the Work Commencement Date (including all phases of mobilization, construction, hand-over and demobilization), not later than xxxxxxx (herein referred to as the "Time for Completion").

In the event of delayed commencement of the Service, the Service Period shall not be affected and shall remain as originally scheduled and agreed as set out in the foregoing paragraph unless otherwise determined by the Company, at its sole discretion, and formally advised in writing to the Contractor.

Retention as Warranty

Also, in assurance of the proper performance of the Work pursuant to the provisions of the Contract, the Contractor accepts that the Company shall withhold and retain an amount of money equal to ten percent (10%) of the value of each invoice to be paid to the contractor in respect of all payments under this Contract. The amounts so retained by the Company shall be returned to the Contractor one (1) year after the Company's issuances of the Certificate of Acceptance of the Work.

In view of the above analysis, Tender Review Team also performed a complete analysis of the cost breakdown of all the bidders and found the lowest bidder (AAAA) to be -3.7% lower to the second lowest bidder (L2) and averaged -3.3% when compared with all the bidders (L2 to L6) which is fairly acceptable.

AAA whose bid price of USD 113,000/- is 51% lower than Company's estimate should be summoned to Company's Contracting Department Office to:

- Confirm that they understand Scope of Work
- Justify their proposed method of accomplishing the work
- Confirm they can perform the work for the quoted price.
- Submit and provide presentation to Company on The Construction Execution Plan which should include overall program for execution, administration, and control of the project as per details:
  - Organizational interfaces between all project parties
  - Guidelines for conducting business between the contracting parties
  - Process and procedures used in performing the work
  - Development of Scope
  - Construction Approach – direct hire and/or subcontracted labor
  - Labor sources
  - Site Administration (administrative, time keeping, billing)
  - Materials management
  - Procurement (who performs, process)
  - Subcontracts (who performs, process)
  - Project Controls (schedules, change control, estimates)
  - Quality
  - Safety
  - Site rules and expectations
  - Confirm and Sign on Company's No-ball letter (copy attached)

As soon as AAA complies with the above actions Tender Review Team recommends awarding the Contract to AAA for their bid price of USD 113,000/-

We request Tender Committee's kind concurrence to award the tender to AAA with contract price of USD 113,000/ ■

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