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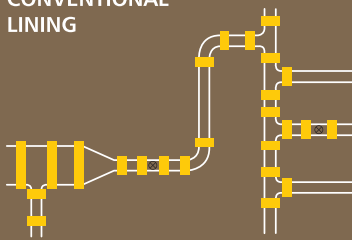
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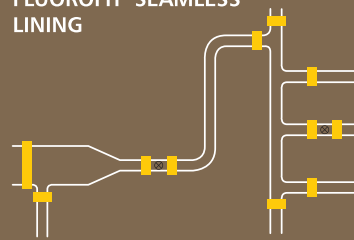
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EPC 4.0: Accelerate digital transformation in the new normal

How can Capital Projects be better managed with EPC 4.0?



Amish Sabharwal

Engineering Business Unit Lead, AVEVA



EPC 4.0 is here and more powerful than ever

In the new normal, Engineering Procurement and Construction (EPC) companies are facing key challenges including reduced Capital Expenditure (CAPEX), increased indirect costs and managing remote 'digital' teams. In fact, according to a [study by McKinsey & Company](#), "companies across sectors and the globe have announced CAPEX cuts ranging from **10 to 80%**".

This means EPC 4.0 or the digital transformation of project execution and asset lifecycle is a critical strategic priority to maximize productivity and efficiency gains. Companies looking to adopt EPC 4.0 can consider the following actions:



Expand the usage of the **Digital Twin technology** beyond the project phase and integrate the design phase with the entire value chain.



Adopt **unified cloud platforms** that provide a common data-centric environment to improve remote work productivity and collaboration.



Take advantage of **emerging digital technologies** to drive operational agility, meet changing customer needs and stay competitive.

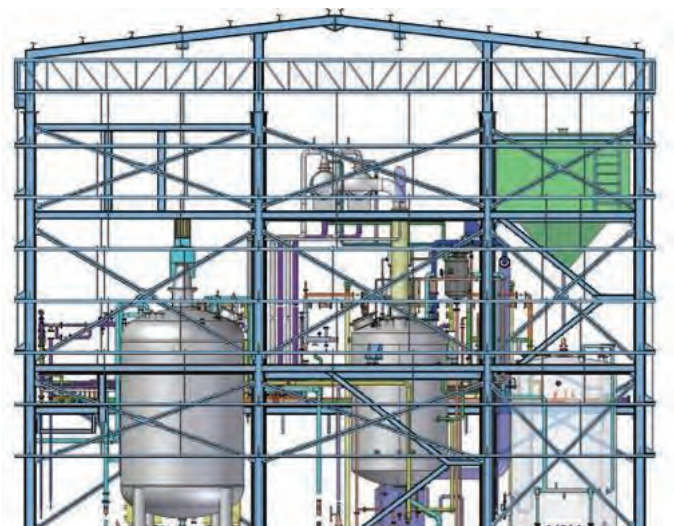
EPC 4.0 is not entirely a new concept for the industry. We have seen companies reduce the Total Installed Cost (TIC) of their projects by **10%**, with **7%** savings in engineering and procurement, and **3%** savings in construction.

Even prior to the pandemic, the industry has long struggled with driving productivity and reducing project costs. Another [study from McKinsey](#) found that **98%** of mega-projects incur cost overruns or delays.

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From Concept to Commissioning

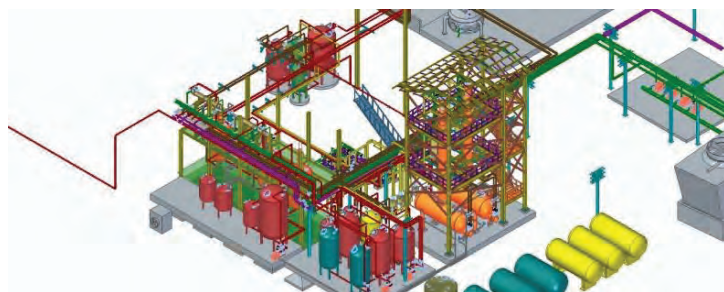
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Liner shrinks into metal pipe

Post lining treatment procedure of lined pipe is ignored

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- Ensures a snug liner fit - a procedure adhered and maintained to eliminate undesirable stress in the finished product
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Maharashtra Pollution Control Board



MPCB has been ranked 1st for performance audit of all State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCC) conducted by Central Pollution Control Board (CPCB) in 2019 for taking various path breaking initiatives. Board has also been awarded with Best Government Organization implementing information security during "IT Innovation & Excellence Awards 2017" by the Computer Society of India.

Air Pollution Management

▪ Air Quality Monitoring Network

Board has developed monitoring network by setting up of manual AAQMS (Ambient air Quality Monitoring Stations-87 nos) across the state under the National Ambient Air Quality Monitoring Program and State Ambient Air Quality program. Data generated through these monitoring programs will help for preparation of action plans to mitigate air pollution. Apart from this, Board has established network of Continuous Ambient Air

Quality Monitoring Stations at 23 locations across Maharashtra. These monitoring stations generate real-time data of all the notified parameters of National Air Quality Standards, 2009. The data is online transferred to Air Quality Index (AQI) server setup at CPCB, New Delhi and AQI is displayed on Boards website

▪ National Clean Air Program (NCAP)

CPCB has identified 18 non-attainment cities in the State of Maharashtra, based on the observation of exceedance with respect to National Ambient Air Quality Standards (NAAQS) 2009.

City Name: Akola, Amravati, Aurangabad, Badlapur, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Nagpur, Navi Mumbai, Pune, Sangli, Ulhasnagar, Mumbai, Solapur, Nashik and Thane

Hon'ble NGT in matter O.A. No. 681 of 2018 directed State of Maharashtra to prepare action plan for 18 non-

attainment cities. Maharashtra Pollution Control Board has conducted series of Workshops with respective Corporations/ Stakeholders conducted for preparation of Non-Attainment City Action Plan. Accordingly, submitted action plan of all 18 cities, CPCB has approved 17 cities Action Plan and 01 City (Thane) Action Plan approval is awaited.

Three level committees for effective implementation of city action plan constituted

- Steering Committee headed by Chief Secretary,
- Air Quality Monitoring Committee (AQMC) headed by Principal Secretary Environment,
- City Level Implementation Committee headed by District collector/ Municipal Commissioner

▪ Noise Mapping

1st Board in the country to carryout Noise Mapping of 27 Municipal Corporation in association with NEERI, Nagpu. The findings of noise mapping report is circulated to all concerned Corporations for its implementation. The Board is also in process of conducting R & D study to categorize Noise contributing sources in ambient air.

▪ Star Rating Program

1st time in the country MPC Board launched Star Rating Program along with

City Rating in which Ratings are given to Industries and Cities based on (particulate matter) PM emission, Also State AQI Bulletins are displayed on Boards Website.

Water Pollution Management

Water Quality Monitoring Network

Maharashtra Pollution Control Board is monitoring water quality in the state of Maharashtra under National Water Monitoring Program (NWMP) and State Water Monitoring Program (SWMP).

Water Quality monitoring under NWMP

- Total Stations : 250
- Surface Water : 200 (River-155, Sea-15, Creek-19, Dam-1, Nala-10)
- Ground Water : 50

Water Quality monitoring under SWMP

- Total Stations : 43
- Surface Water : 21 (Sea-1, Creek-1, Dam-3, Nalla-2)
- Ground Water : 15

▪ River Rejuvenation

Environment Dept., Maharashtra Government has constituted River Rejuvenation Committee (RRC) to prepare & implement Action Plans for rejuvenation of rivers. Accordingly, Action Plans of 53 rivers are submitted

to Hon. NGT and implementation is under progress.

The State does not allow any industry to discharge treated/untreated effluent into the rivers.

The State has issued Directions to the local bodies to make 25% budgetary provision for scientific treatment and disposal of Sewage and Solid Waste. These funds are reserved and made mandatory to utilise for preparation of DPR, establishing treatment facility, O & M of treatment facility etc

Water Quality Index for 206 locations in the state of Maharashtra is published on monthly E bulletin of water quality. It provides a simple indicator of water quality and a general idea on the possible problems with the water in the region

Plastic Waste Management in the state of Maharashtra

- Plastic Waste (Management & Handling) Rules, 2011, came into force as per the notification published by Ministry of Environment and Forest & Climate Change (MoEF&CC), New Delhi vide dated 4.2.2011 and later on same has been superseded by the Plastic Waste Management Rules, 2016 notified vide dated 18.3.2016.
- In the State of Maharashtra, there are total 262 local bodies, comprising of 27 Municipal Corporations, 16-

'A' Class Municipal Council, 54- 'B' Class Municipal Council, 150- 'C' Class Municipal Council, 09- Nagar Panchayat and 06-Cantonment Boards.

- Total MSW Generated from these local bodies is @ 23450 MT/day. Out of which @ 4-5% is Plastic waste (@ 1172 MT/day). Major Cities of Maharashtra namely, Mumbai, Thane and Pune, contributing 450 MT/day, 90 MT/day & 145 MT/day of plastic waste respectively.
- For effective implementation directions were issued to all Local Bodies for development and setting up infrastructure facility for segregation, collection, storage, transportation, processing and disposal of plastic waste.

New Notification published by Government of Maharashtra

- Government of Maharashtra under the provisions of Maharashtra Non-biodegradable Garbage (Control) Act, 2006 has published new notification namely Maharashtra Plastic and Thermocol Products (Manufacture, Usage, Sale, Transport, Handling and Storage) Notification, 2018 for regulating manufacture, usage, sale, storage, transport of the products made from plastic and thermocol vide dated 23.3.2018 and its amendment dated 11.4.2018.

- Maharashtra State has enforced the ban to manufacture, usage, transport, distribution, wholesale & retail sale and storage, import of the plastic bags with & without handle, and the disposable products manufactured from plastic & thermocol (polystyrene) such as single use disposable dish, cups, plates, glasses, fork, bowl, container, disposable dish/bowl used for packaging food in hotels, spoon, straw, non-woven polypropylene bags, cups/pouches to store liquid, packaging with plastic to wrap or store the products, packaging of food items and food grain material etc including purchase & use of plastic and thermocol items used in decoration purpose.
- Maharashtra State allowed use, purchase, sale, storage and manufacture of PET or PETE bottles made up of high quality food grade virgin Bisphenol-A free material and printed on it with predefined buy back price with certain conditions.
- The State has initiated action against the defaulters of this notification by issuing closure directions to 272 nos. of plastic industries of the state.

The State is allowing some of the plastic products those have prepared Extended Producer Responsibility (EPR) action plan for plastic waste management and accordingly @ 400 plastic producers/

brand owners have submitted their EPR.

Industrial Pollution Control

The board prescribes sector specific standards while granting consents to these units. While granting consent, the board also scrutinizes the adequacy of pollution control system & offers advice on some additional studies or advance control system, wherever required. Besides the notified standards of MoEF & CC / CPCB, the Board also prescribes the stringent norms to industries located in critically polluted Areas & Severely Polluted Areas. MPCB shares best achievable benchmarks with the industrial units within the same sectors and encourage them to adopt or achieve the standards.

MPCB encourages chemical industries to segregate trade high Chemical Oxygen Demand (COD) & Total Dissolved Solids (TDS) effluent into strong stream and low COD & TDS effluent into weak stream and treat both the effluent streams separately to meet the consented standards and reduce operational cost of treatment system. Industries are mandated to install air pollution control (APC) units including adsorption beds, thermal incinerators for Volatile organic Content (VOC) emissions control as per prescribed standards. MPCB carries out regular vigilance through random field visits for operational and maintenance status of pollution control system.

Board has mandated 17 category industrial units to install Online Continuous Emission Monitoring System (OCEMS) & upload real time data on Board's server which helps the regulator to constantly keep track of pollution parameters in Real Time from the office. Board has also made Hazardous waste (HW) manifest system online for tracking the HW for its sound and scientific disposal. This has eliminated several shortcomings which existed in earlier manual Manifest system.

Ease of Doing Business

1. Introduce a system for online application:

The online portal has been developed and put into operation from 1st Feb-2016. This allows online application and payment without the need for a physical touch point for document submission and verification. The Proponent will get information about their application status through email and SMS. The provision is also there to make the payment online through E-Payment Gateway, RTGS and NEFT. The Proponent can download their consent document from the portal also views their documents, visit report, instruction letter etc online. This services has been integrated with Government of Maharashtra's MAITRI portal and all applications routed through MAITRI portal.

2. Reduction in time span for processing to expedite disposal/ grant of Consent and Authorization

As per the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 time span for granting consent is 120 days. However, the Board has reduced the time span up to 60 days under Ease of Doing Business (EoDB) and started to implement. Recently, the Government of Maharashtra implemented concept of "Maha Parvana" under which amended service delivery timeline & timely delivery of service. Accordingly, Board has reduced time span of granting consent up to 30 days for Red category industries and started implementation of the same

3. Scheme of Auto-Renewal of Consent based on self-certification for Red, Orange & Green Category industries

Board has decided to implement Auto-Renewal Policy for all categories of industries i.e. Red, Orange & Green Category. The Corrigendum to the above circular has been issued on 03.12.2015 and the Auto-Renewal scheme is made applicable based on self-certification.

4. Simplified Consent Application form for Green Category industry

The Board has decided to introduce Simplified Consent application form for

obtaining Consent for 'Green' category of industries. The eight pages Consent application from has been simplified and reduced to two page by removing unnecessary filed so as to ease the project Proponent while applying for consent.

5. Grant of Renewal of Consent to Operate for a minimum period of Five Years for Large/ Medium scale and a minimum period of Three Years for Small scale industries excluding Sugar industries

6. Randomized Risk based inspection & sampling

Department of Industrial Policy and Promotion (DIPP) under 'Ease of Doing Business' Project recommended Business Reforms to various departments in Maharashtra which includes initiation of 'Central Inspection System(CIS)' wherein four government departments namely – MPCB, Labour Directorate, Maharashtra Labour Welfare Board(MLWB) and Directorate of Industrial Safety & Health(DISH), will visit the Industry jointly. Software base system developed in such way that, same inspector will not inspect the same establishment/industry/ organization twice consecutively.

The field officers of the Board getting schedule of sampling and inspection monthly through Central Inspections

System and same is monitored through automated software-based tool.

7. Upload inspection report within 48 Hours:

Delivery of services during COVID 19 Pandemic situation:

a. Standard Operating Procedure for Inspection:

Maharashtra Pollution Control Board is mandated for Prevention, Control and Abatement of Pollution in the Environment and secure execution thereof. Board is inspecting/verifying the compliance of industries on regular basis. Due to current COVID-19 situation, Board prioritized the inspection procedure and developed standard operating procedure for inspection and circulated among the officials to inspect industries with due care.

b. Extension of validity period of consent expired on 31/03/2020:

Government of India and Government of Maharashtra have issued Government Resolutions/Orders for operation of various essential commodities industries which included pharma, Bulk Drug and continuous process industries, along with respective supply chains industry and due to COVID-19 situation, most of the industries unable to apply for

renewal of consent. Hence, Board decided to extend the validity period of the industries for 04 months i.e. upto July 2020 and accordingly issued Circular on 31/3/2020 which further extended upto Sept 2020 vide circular dated 28/4/2020.

c. Consent Management: Online processing of Consent Applications

Government of Maharashtra, decided to start the support offices/vigilance offices as per the requisite staff strength to deliver/perform their duties and also encouraged staff to work from home. Consent Management is one of the important work of Board officials and Board has made necessary changes in web portal to process the consent application online to encourage the staff to work from home.

d. Strict safety precaution to be taken before resuming operations of units after/during COVID-19 lockdown:

Most of the industrial operations are not in operation and while resuming the operation of the unit there is possibility of mishap which resulting accident hazard causing consequences to the person & environment. Some serious cases of chemical leakage & industrial mishap reported recently. Board has requested industries to take various steps before resuming the operations and issued

circular on 11/5/2020 in this regard.

e. Modules for encouraging work from home:

Board has developed Office Note module for inter official correspondence which help in work from home. Also, developed Legal Action Module for initiation of action against the defaulter units which helps for transparency in initiation of action.

f. Compliance Portal:

This portal is developed for Industries to submit logbooks on daily basis on the treatment system used at their end. This enables MPCB officer to review the compliance of industry on regular basis. ■



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India to nearly double its energy consumption over the long term: Narendra Modi



Narendra Modi, Prime Minister of India

New Delhi, India: Hon'ble PM delivered inaugural address at 4th India Energy Forum CERAWeek through video conference. The theme of this edition is "India's Energy Future in a world of Change". Speaking on the occasion, the Prime Minister said India is full of energy and its energy future is bright and secure. He elaborated that in spite of various challenges like fall in energy demand by almost one third, prevailing price instability, impacted investment decisions, projected contraction in global energy demand over the next few years, India was projected to emerge as a leading energy consumer and is projected to nearly double its energy consumption over the long term.

The Prime Minister pointed that India is the third largest and the fastest growing aviation market in terms of domestic aviation and Indian carriers are projected to increase their fleet size from 600 to 1200 by 2024. He said India believes that access to energy must be affordable and reliable. That is when socio-economic transformations can take place. He said the energy sector empowers people and furthers "Ease of Living" and he listed Government's initiatives to achieve this. He

said these initiatives particularly helped the rural people, middle class and the women.

The Prime Minister said India's Energy Plan aims to ensure energy justice while fully following India's global commitments for sustainable growth. This means more energy is needed to improve the lives of Indians with a smaller carbon foot-print. He envisioned India's energy sector to be growth centric, industry friendly and environment conscious. He said that is why India is among the most active nations in furthering renewable sources of energy.

The Prime Minister listed the interventions which made India the most attractive emerging market for clean energy investment viz. distributing more than 36 crore LED bulbs, reducing the cost of LED bulbs by 10 fold, installing over 1.1 crore smart LED street-lights in the last 6 years. He said these interventions have enabled an estimated energy savings of 60 billion units per year, estimated greenhouse gas emission reduction of over 4.5 crore tonnes of Carbon dioxide annually and monetary savings of around Rs. 24,000 crore annually. The Prime Minister remarked that India is well on track to meet the global commitment. He said the target to increase the installed renewable energy capacity to 175 GW by 2022 has been further extended to 450 GW by 2030. He said in spite of India having one of the lowest carbon emissions than the rest of the industrialized world, India would continue its efforts to fight climate change.

The Prime Minister said the reform in the energy sector has been fast paced in the last six years. He listed many path-breaking reforms brought out recently like the reforms in Exploration and Licensing Policy, shifting the focus from 'revenue' to 'production'



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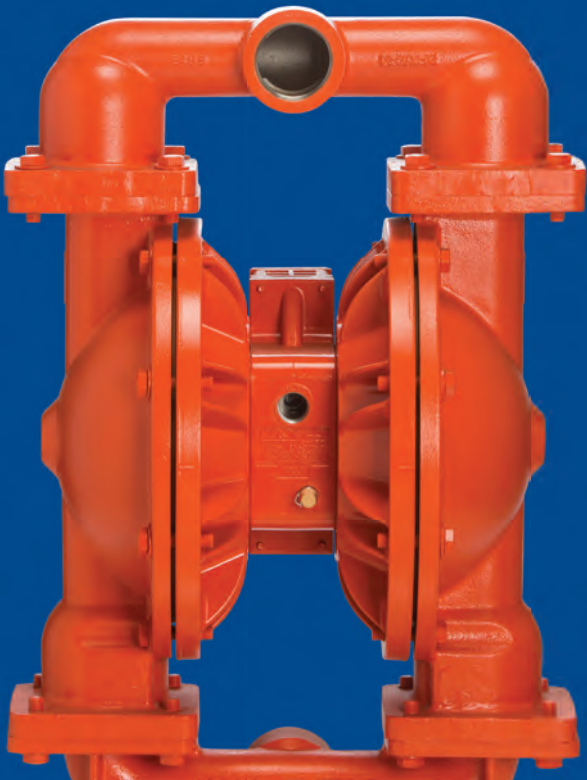
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maximisation, focus on greater transparency and stream-lined procedures and plan to grow refining capacities from about 250 to 400 Million Metric tonnes per annum by 2025. He said increasing domestic gas production has been a key government priority and would be achieved through 'One Nation One Gas Grid' to shift the nation towards a gas-based economy.

The Prime Minister urged the community to make the crude pricing more responsible. He urged the community to work towards creating transparent and flexible markets for both oil and gas. He said to increase domestic production of natural gas and to bring uniformity in the market price discovery of gas, the Government has brought Natural Gas Marketing Reforms which would give greater marketing freedom in the sale of natural gas through e-bidding. He added India's first automated national-level gas trading platform was launched in June this year which prescribes standard procedures to discover the market price of gas.

The Prime Minister said the Government is moving forward with the vision of 'आत्मनिर्भर भारत'. He added a Self-reliant India will also be a Force Multiplier for the global economy and Energy security is at the core of these efforts. He said these efforts have started yielding positive results by way of increased investment in the oil and gas value chain during these challenging times and similar signs are seen in other sectors too. He said the Government is driving strategic and comprehensive energy engagements with the key global energy players. He added as part of India's Neighbourhood First Policy, development of energy corridors with our neighbouring countries is prioritized for mutual benefit.

Oil PSUs portal to promote Aatmanirbhar Bharat



Dharmendra Pradhan Union Minister, MoPNG & Steel

New Delhi, India: Inspired by the vision of the Honorable Prime Minister for an Aatmanirbhar Bharat, a reliable and scalable portal has been envisaged for all Oil Companies. Based on the theme "Delivering excellence through people", this initiative, taken under the guidance of Honorable Minister of Petroleum & Natural Gas and Steel Dharmendra Pradhan, aims to highlight the Capital goods requirement of Oil & Gas majors besides the items related to Maintenance, Repair, and Overhaul (MRO).

As a Make in India initiative, this web-based-portal will provide opportunities to new entrepreneurs and existing manufacturers to invest and expand their manufacturing base in India. This portal shall also provide real-time data, along with visual indicators in the form of graphs and charts, to facilitate decision making for the apex management and other stakeholders. To achieve this objective, a special Taskforce, under the leadership of Secretary, MoP&NG, has been formed. This Taskforce comprises of the Chairpersons

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of various Oil & Gas PSUs (like Indian Oil, EIL, ONGC, GAIL, BPCL, HPCL) and Private Refiners. Engineers India Limited will be leading the development of this portal from concept to commissioning under the guidance of this task force.

The development of the portal is being monitored and reviewed regularly by the Honorable Minister of Petroleum & Natural Gas and Steel. During one such review meeting, held in the morning today, the Minister advised "The proposed portal should provide information on procurements made from Micro/Small Enterprises or from SC/ST/Women entrepreneurs". He further emphasized "The need to develop the portal on a war footing basis to further the cause of a self-reliant India".

"Our main purpose is to make our contractors dream big and contribute towards an AtmaNirbhar Bharat", said Tarun Kapoor, Secretary, MoP&NG, during a separate webinar for Contractors of Oil & Gas PSUs held today. The Webinar highlighted the features of a dedicated Web Portal for the Vendors.

Under the aegis of the Ministry of Petroleum

& Natural Gas, Oil PSUs are regularly holding digital Vendor Meetings with the core theme of Localization. More such Vendor Meets shall be held in the coming months. This Oil PSUs-initiative that goes 'Vocal for Local' will open up a plethora of opportunities for the community of Indian suppliers.

Union Minister MoPNG inaugurates H-CNG Plant and Launches trials in Delhi

New Delhi, India: Dharmendra Pradhan, Union Minister of Petroleum & Natural Gas and Steel, inaugurated IndianOil's compact reformer plant and launched the much-awaited trial run of Delhi's buses on Hydrogen-blended CNG (HCNG) at the Rajghat Bus Depot-I of DTC. In India's quest to promote Hydrogen as a clean fuel for the mobility sector, Hydrogen-blended HCNG is emerging as an excellent interim technology for achieving emissions reduction and import substitution. Complimenting the initiatives of IndianOil, the Minister said, "I am happy to note that the scientists of IndianOil R&D have risen to the occasion and have developed an



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An expansive view of L&T Hydrocarbon Engineering's state-of-the-art Modular Fabrication Facility in Kattupalli, India



Gas Production Modules and Tie-in Platforms fabricated at the company's Sohar Yard in Oman



Wellhead platform and Process-cum-Living Quarters Platform installed off India's east coast



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innovative compact reforming technology for production of Hydrogen-mixed CNG." Elaborating on the importance of Hydrogen in facilitating India's energy transformation, the Minister mentioned, "Hydrogen is the ultimate fuel, which, while giving energy, produces clean water in the emissions. Apart from this, it has many other virtues as the capacity to get the rural sector involved with the energy sector through biomass". The Minister said that this pilot project will be unique. It will help the county and the world as a whole.

Speaking on occasion, S M Vaidya-Chairman-IndianOil, said that the latest technological development would augur well with the nation's vision & commitment to transit towards the hydrogen economy. Talking about IndianOil's pioneering work in hydrogen research, he said, "IndianOil took early steps in promoting Hydrogen initiatives. We also launched a research program on HCNG alongside the Society of Indian Automobile Manufacturers (SIAM) and MNRE. IndianOil has set-up two Hydrogen and HCNG dispensing stations: one at our R&D campus in Faridabad and another at our retail station at Dwarka, Delhi". He expressed hope that more partnerships will be formed.

Globally, Hydrogen required for blending in CNG (Compressed Natural Gas) is produced through electrolysis of water, followed by high-pressure blending with CNG. This process's high cost offsets the savings achieved from fuel economy gains compared to baseline CNG. In India's continuous quest to use hydrogen as a fuel for the mobility sector, hydrogen blended CNG (commonly called H-CNG) has emerged as an excellent interim fuel for achieving emission reductions and import substitution. The existing IC engine without any significant modification can be run on H-CNG and with minimal

infrastructural upgrade, the existing CNG dispensing refueling infrastructure can be used to deliver H-CNG blends as well.

H-CNG blends can be produced directly from CNG, bypassing the energy-intensive electrolysis process and high-pressure blending costs. The flexible and robust process allows the production of H-CNG on-site, in less severe conditions, and under low pressure. It provides a higher yield H-CNG mixture by up to 4% to 5% compared to CNG's input quantity and cost of H-CNG production by this above process is about 22% cheaper than conventional physical blending.

Sterling and Wilson to Build Solar Storage Hybrid Power Plant in Niger



Deepak Thakur, CEO, SWPL

Mumbai, India: Sterling and Wilson Pvt Ltd (SWPL), India's leading engineering, procurement and construction (EPC) company, announced that it's Hybrid & Energy Storage division (HES), in consortium partnership with French EPC company Vergnet and SNS Niger, has signed an EPC contract to construct a Solar PV Battery Storage and Diesel Genset based hybrid power plant in Agadez, Niger, in West Africa. Tendered by The Nigerian Electricity Company



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(NIGELEC), the project consists of 18.9MWp solar + 11.55MWh/3.0 MVA battery energy storage system (BESS) + 6.54 MVA (2.18 x 3 MVA) diesel generator and 20 kV substation, and evacuation line up to the Nigelec Substation in Agadez. The consortium will also be responsible for a two-year operation and maintenance (O&M) service of the power plant. Battery-based energy storage enables generated electricity to be stored and delivered at any given time, providing stability to the grid, and enabling energy delivered on demand. It will also aid flexibility and agility to better integrate solar and diesel energy into the electricity grid of the city and ensure quality power. The project also includes the rehabilitation of the electrical network of the city of Agadez, which does not allow the evacuation of electricity to and within the city, and the electrification of the neighbouring hamlet of Tibinitene.

Speaking on the occasion, Deepak Thakur, CEO – Hybrid & Energy Storage, Sterling and Wilson said, "We are extremely delighted to have secured another prestigious opportunity in Africa after successfully commissioning Nigeria's first solar storage hybrid power plant, which is also Africa's largest battery energy storage system. Hybrid energy solutions is a huge opportunity as many power generation and distribution companies in places like Africa are moving into renewables."

O&M services will comprise complete system and rehabilitation of the electrical network of the city of Agadez, and the electrification of the neighboring hamlet of Tibinitene. The consortium will provide project management assistance and institutional support to train engineers and technicians of Nigelec in photovoltaic technologies to enable them to operate large-scale solar power plants in the short term and to ensure smooth functioning

of the plant even after two years. Niger, a landlocked country located in West Africa, has only recently resorted to Solar PV and Diesel with Battery Storage Hybrid project as an energy source for such remote locations. The project would be Niger's first ground-mounted Solar PV, Diesel and Battery Storage based power plant and is crucial for Agadez, a city which is located at the gateway to the Sahara Desert and isolated from the rest of the country.

New Alfa Laval Fluid Handling Application & Innovation Centre opens in Denmark



Kolding, Denmark: Alfa Laval – a world leader in heat transfer, centrifugal separation and fluid handling – is opening a state-of-the-art Application & Innovation Centre in Kolding, Denmark. The centre will reinforce the company's technology leadership within hygienic fluid handling and put Alfa Laval squarely at the forefront of customer engagement, product innovation and optimization of customers' processes.

Investing in the new 1,600-square-metre Application & Innovation Centre supports Alfa Laval's strategic focus of accelerating product innovation and driving customer preference for Alfa Laval pumps, valves, and cleaning and mixing equipment used in the food and pharmaceutical industries.



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"It's all about taking our customers' production to the next level," says Mikkel Nordkvist, Vice President, Hygienic Fluid Handling, Head of Industry Management. "Customers can see – either in person or by live link – how Alfa Laval equipment performs under their actual operating conditions. Conducting trials with Alfa Laval industry experts provides verification of higher yield, improved hygiene, and sustainable cost reductions by saving energy, water and cleaning media. It's a golden opportunity to validate overall performance." "The centre provides a unique environment to develop tomorrow's fluid handling technologies and equipment. Multiple testbeds with advanced hardware and software enable us to drive innovation by conducting rigorous proof-of-concept experiments on new equipment for the food and pharma industries at many duty points under close-to-actual conditions," says Rikke Kau Breinholt, Vice President, Hygienic Fluid Handling, and Head of Research & Development, Alfa Laval. "Moreover, with insights from customer trials, we can further refine our equipment and are able to introduce new customer-centric products and product enhancements to the market faster than before. Accelerating product development and innovation, in turn, means that we can deliver more value to our customers."

Covestro takes first step in global capacity expansion for films

Leverkusen, Germany: Covestro has launched a new production line for polycarbonate films in the Map Ta Phut Industrial Estate in Thailand. With the new capacity, the company aims to meet the rapidly growing demand in the Asia-Pacific region and to strengthen its own position as a market leader in this field. The films are mainly used in the automotive, telecommunications,



Sucheta Govil, CCO, Covestro

medical technology and ID document sectors. The project is the first step in a global expansion of Covestro's plastic film production. The total investment of more than 100 million euros also includes an expansion of the associated infrastructure and logistics to shorten delivery times. More than 100 new jobs will be created worldwide.

"With this additional production line using state-of-the-art technology, we are investing in future growth in the Asia-Pacific markets, which are very important to us," says Sucheta Govil, Chief Commercial Officer (CCO) at Covestro. "At the same time, we are responding to the rapidly growing demand for specialty films in this region and are supporting the expansion of promising technologies and industries."

Dr. Thorsten Dreier, Global Head of Specialty Films, sees advantages in customer service: "The new production line is important to us because it enables faster market launches and at the same time expands our market access in Asia-Pacific. Our most important goal is to intensify our cooperation with customers in the region and to increase our efficiency. We intend to drive growth in the plastic film business with innovations and a stronger customer focus."

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2	Chilled Water Temp in °C (Assumed)	5°C	5°C
3	Supply Temp. from CT / LTMCS	33°C	30°C
4	Approach to WBT	4°C	1°C
5	ΔT for Chiller	28°C	25°C
6	Chilled Water Compressor Motor Kw for 1200 TR	720	643
7	Energy Saved in %	-	10.7%
8	Energy Saved in Kw	-	77 Kw/Hr
9	Total Running Hours per Annum	8640	8640
10	TOTAL POWER SAVED PER ANNUM	-	6,65,280 Kw



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Covestro has been operating a production facility for specialty films in Thailand since 2007. The range comprises polycarbonate films from the Makrofol® range and Bayfol® products made from polycarbonate blends. The new line is equipped with the latest technology and operates very efficiently. As a further measure in the investment program to expand film production, Covestro has already converted a coextrusion film plant in Guangzhou, China, for the future. At the South Deerfield site in the USA, the efficiency and quality of film production was also improved. The next milestone will be the expansion of films production in Dormagen, where the company is currently building up new coextrusion capacities. This project is scheduled for completion by the end of 2020.

Sunil Kumar succeeds Shilip Kumar as President Henkel India

40



Sunil Kumar , Country President, Henkel Adhesives Technologies India Private Limited & Henkel Anand India Private Limited.

Mumbai, India : Henkel has appointed Sunil Kumar as the Country President of its India

businesses, effective 1st October 2020. In this role, he will be responsible for guiding Henkel's adhesive and beauty care businesses in India and the two legal entities of the company in the country, Henkel Adhesives Technologies India Private Limited and Henkel Anand India Private Limited. Besides this role, Sunil will continue in his existing role of Regional Business Director – Packaging SBU for India, Middle East & Africa (IMEA), Henkel Adhesive Technologies.

Sunil Kumar succeeds Shilip Kumar , who led the India business for over four years, and will now move to Shanghai as Vice President – Metals for IMEA & APAC (Asia Pacific). Sunil joined Henkel in January 2015 as Business Director - Packaging & Consumer Goods, South Asia. In this role, he was responsible for Flexible Packaging, Packaging and Labelling, Paper, Tapes, Labels, Personal Hygiene, Building, Construction and Sports and Fashion businesses in the country.

Commenting on his new role Sunil Kumar said, "I am pleased to have taken up the additional responsibility of President - Henkel India. Firstly, safety has been and will always remain our top priority. It also strongly continues in all areas during the ongoing COVID phase. From a growth perspective, we are very confident that India offers considerable growth potential for decades to come, hence Henkel's global long-term strategic focus on "Purposeful Growth" will be lived strongly in India. Our endeavor will be to effectively utilize the strong resources and investments made by our parent company and leverage this to the highest growth potential in the country. We will continue to focus on delivering excellence through innovative technologies and solutions; thereby bringing sustainable, differentiated value to our customers in the country."



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Sterling Auxiliaries acquires chemicals manufacturing site from Baker Hughes

Southbury, USA: Sterling Auxiliaries Pvt. Ltd. and its parent company, Artek Surfin Chemicals Ltd., a leading producer of specialty chemicals with manufacturing capabilities across four continents, have agreed to acquire the land and assets associated with Baker Hughes' Sand Springs, Oklahoma, chemicals manufacturing facility.

The Sand Springs facility, which includes approximately 120 employees who will transfer with the sale to Sterling, manufactures oilfield specialty chemicals. As part of the transaction, Baker Hughes will enter into a long-term toll manufacturing agreement with Sterling at the Sand Springs manufacturing site. The new Sand Springs entity will be called Sterling Specialty Chemicals LLC. "The purchase of Baker Hughes' Sand Springs chemicals manufacturing assets is another key step in our global vision and growth strategy as we continue to pursue additional strategic acquisitions such as this," said Vishal Goenka, Director, Artek Surfin Chemicals Ltd., parent company of U.S.-based Galata Chemicals and India-based Sterling Auxiliaries. "Sterling and Baker Hughes have worked together globally for nearly 10 years. This transaction is a testament of our deep relationship, and we look forward to continue this partnership in the years ahead."

Birla Carbon & CHASM Advanced Materials sign strategic partnership

Mumbai, India & Marietta, USA: Birla Carbon, a leading global manufacturer and supplier of carbon black, and CHASM

Advanced Materials Inc., a leading developer, and manufacturer of proprietary advanced materials hybridized at the nanoscale, have elevated their joint development agreement into a strategic partnership to commercialize novel nanomaterials to benefit various market segments including high-performance tires, conductive plastics, novel coatings, and next-generation batteries.

Announcing Birla Carbon's strategic investment in CHASM, Dr. Santrupt B. Misra, Chief Executive Officer, Birla Carbon, Director, Chemicals, and Director, Group Human Resources, Aditya Birla Group, said, "We are proud to become a strategic technology partner to CHASM, building on our ongoing joint development agreement. Birla Carbon's investment will drive the commercialization of NTeC™ nanomaterials, strengthening our ties with CHASM and securing the future of this game-changing technology". He further added, "This partnership is an excellent example of how Birla Carbon 'Shares the Strength', by strategically investing in the future of the industry."

"Since formalizing our initial agreement with Birla Carbon under a year ago, both companies together have overcome technical hurdles to advance NTeC technology from lab-scale feasibility to a repeatable and scalable pilot-scale process capable of producing kilogram-scale quantities of a variety of NTeC compositions. We're excited to continue building on our already strong partnership, driving NTeC's next phase of commercialization and broad market adoption." stated David Arthur, CHASM, Chief Executive Officer and Co-founder.

Birla Carbon and CHASM announced a joint development agreement in November 2019 to develop novel, hybrid nanomaterials that combine CHASM's nanotube enhanced carbon (NTeC) technology with Birla

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Carbon's expertise in commercialization and manufacturing. The success of this joint development has led to Birla Carbon making the strategic investment in CHASM. The collaboration is ultimately aimed at driving sustainable, innovative solutions to address customer, consumer, and industry needs.

AVEVA Recognized by Frost & Sullivan with the 2020 Best Practices Award

Mumbai, India: AVEVA, a global leader in engineering and industrial software, today announced it had been recognized with this year's Frost Radar™ Best Practices Award for growth, innovation, and leadership excellence in the asset performance management (APM) market. The Frost Radar is a dynamic tracking tool that offers the frequent rating and positioning of companies that are leading the industry in growth and innovation. The Growth Innovation Leadership (GIL) Best Practices Award is bestowed on companies that consolidate or grow their leadership position by continuously innovating and creating new products and solutions that serve the evolving needs of the customer base.

AVEVA was recognized with the GIL award for its strong digital and innovative initiatives and features included in its APM 4.0 framework, including AVEVA Insight, a cloud offering that provides end users with actionable insights from anywhere, anytime, and any device. AVEVA's APM 4.0 framework (connecting engineering, operations, and performance) enables customers to predict unplanned failures and balances four key value drivers, such as asset performance, safety and compliance, cost control, and resource management, to drive the greatest monetary and business value for customers.

AVEVA's artificial intelligence (AI) and machine learning (ML) capabilities (e.g., predictive and prescriptive maintenance) are cited as well, which have helped many customers increase equipment reliability and operational performance. Ram Ramasamy, Global Client Leader at Frost & Sullivan: "The APM market is evolving from a linear value chain to a circular digital-thread-centric value chain. AVEVA's APM 4.0 framework, which connects engineering, operations, and performance, aligns with this transformation. AVEVA's APM 4.0 balances four key value drivers, namely asset performance, safety and compliance, cost control, and resource management, in a business context to drive the greatest monetary and business value for customers."

"This award is testament to AVEVA's strong position in the APM market, particularly given the in-depth and robust nature of this report," said Kim Custeau, APM Business Lead at AVEVA. "Frost & Sullivan's recognition of our APM offering and value delivered to customers this year is a great accomplishment for AVEVA. In a challenging global environment, AVEVA is committed to helping organizations accelerate their digital transformation journey, by helping them manage risk and reduce OPEX."

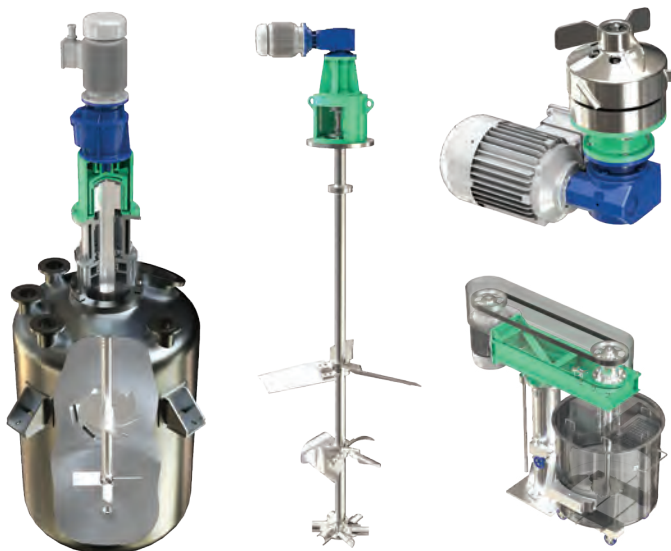
Crane ChemPharma & Energy Announces New Engineered Check Valves Facility

Satara, India: Crane celebrated groundbreaking ceremony of its new Check Valves factory in Satara, India. The event was hosted by Crane Process Flow Technologies India Private Limited and ChemPharma & Energy, Duo-Chek® and Noz-Chek®, businesses of Crane Co, and

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shared via live broadcast. Led by Mr. Hari Jinaga, the President of Crane India, in remote presence of Customers, business partners and other global leaders of Crane, the ceremony provided a preview of the new plant capabilities that will be completely dedicated to its Engineered Check products.

The new facility which is planned to open in October 2021 will manufacture Noz-Chek® and Duo Chek® product lines up to 84". The plant will meet the stringent quality and product approvals and will be capable of in-house machining for all offered size ranges. The facility will feature automated welding and in-house High-Pressure Gas and Cryogenic Testing for valves up to 72". Certified testing will be offered per Customers' specific temperature or pressure requirements, detailing leak rates as well as a graphical representation of the testing cycle. "Crane has maintained operations in India for nearly 30 years and it's important to us that we continue to invest in the community and increase the ways in which we provide local support," said Hari Jinaga, President, Crane India. "The facilities that have been built here in Satara are best-in-class; our new Engineered Check Valves factory will reflect digital transformation trends and feature a fully automated manufacturing process to ensure our products maintain the quality Crane is known for".

AkzoNobel to strengthen paints business with acquisition of Titan in Spain



Thierry Vanlancker, CEO & Chairman of the Board of Management

Amsterdam, Netherlands: AkzoNobel is to further grow in Europe after agreeing to acquire the decorative paints business of Spain's Industrias Titan S.A.U. Completion is subject to regulatory approvals and expected before the end of Q1, 2021. Titan – which also has a relevant presence in Portugal – is one of Spain's best-known brands. The business shares AkzoNobel's commitment to sustainable product innovation, with much of its portfolio having received recognition for environmental performance.

"The Spanish market has strong growth potential and this is an excellent opportunity for us to reinforce our position in the region," says AkzoNobel CEO, Thierry Vanlancker. "The acquisition will enable us to better serve our customers and provides added momentum, while also offering further proof of us being the reference in paints and coatings in Europe. "The fact that a significant part of Titan's portfolio has been awarded the European Ecological label also offers exciting possibilities for combining our technologies and expertise, which will result in us developing better and more sustainable products."

Commenting on the deal, Alberto and Joaquin Folch-Rusiñol, Industrias Titan S.A.U

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administrators, add: "We're delighted to hand over Titan's decorative paints business to a global leader like AkzoNobel. We're confident they will care for Titan's legacy in the same way the family has done for over 100 years." Continues Vanlancker. "Titan has a proud heritage and a long track record of innovation and continuous improvement – qualities that we strongly relate to. It's therefore a perfect fit for us and will provide a solid platform to further grow our position throughout the region."

Piramal Pharma to Acquire Navin Fluorine's Stake in Convergence Chemicals at INR 65.10 Crores

Mumbai, India: Piramal Pharma Limited (PPL), a subsidiary of Piramal Enterprises Limited (PEL), and Navin Fluorine International Limited (Navin Fluorine) today announced a mutual agreement to increase Piramal's stake in Convergence Chemicals Private Limited (CCPL) to 100% by buying out Navin Fluorine's 49% stake in CCPL at INR 65.10 crores. Recently, PEL transferred its entire stake in CCPL to PPL.

CCPL, incorporated in November 2014, develops and manufactures specialty fluorochemicals, primarily starting material required for PPL's anesthetics production. As PPL continues to grow its anesthetics business, its resultant requirement for the starting material is expected to increase in the coming years. Similarly, it is expected that Navin Fluorine will leverage the developed chemistry for growth in certain specialty chemical segments. As a part of this arrangement, Navin Fluorine would obtain from PPL a perpetual license to use the technical knowhow for development and marketing of select products, and Navin Fluorine would continue to be a key raw material supplier to CCPL.

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Deepak Nitrite reports sharp rebound in Q2FY21



Deepak C Mehta
CMD, Deepak Nitrite Ltd.

DNL's Standalone Revenues improved by 26% to Rs. 448 crore in Q2 FY21 as compared to Rs. 355 crore in Q1 FY21, during which company operated for only 2 months, as volume demand inched back toward normal from key end segments. The company also increased focus on the export market. All the strategic business units (SBUs) rebounded strongly to report double-digit growth. On a Consolidated basis, Revenues were higher by 46% at Rs. 991 crore in Q2 FY21 compared to Rs. 681 crore in Q1 FY21 during which production was affected by about 1 month. Despite higher imports, DPL delivered sustainable production in excess of 100% of capacity and identified key export markets in lieu of domestic demand.

Commenting on the performance, **Deepak C. Mehta, Chairman & Managing Director**, said, "In spite of several challenges, the Company could achieve stellar performance on a consolidated basis. This has been made possible due to significant hard work put in by the team to ensure highest capacity utilization where possible through planning to mitigate supply chain challenges. DNL's performance and attractiveness is highly influenced by its breadth and depth

Vadodara, India: Deepak Nitrite Limited (DNL), one of India's leading chemical intermediates company, has announced its financial results for the second quarter ended 30th September, 2020. The Company has embarked on its 50th year of operations with a strong operational performance. DNL's wide product portfolio and process expertise **remain bulwarks against global challenges. Keeping a 'People First' approach has allowed all plants across locations to operate at a high level of productivity** while stringently observing Government mandates and regulations. All brownfield projects taken up will be commissioned in Q3 and lead to further improvements in profitability.



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of products and process competency. This resilience has been instrumental in delivering dependable returns regardless of the myriad challenges that were faced through the quarter.

While in the near term, investments that increase our competitiveness will start bearing fruit, the Company continues to broaden its range of products as well as invest into value addition. In the long term, increased investments towards R&D, operational excellence, adding new products, are contributing to achieving 'Atmanirbhar' for the Nation."

52 Deepak Phenolics witnessed revenues increase by 26% y-o-y with EBITDA growth of 229%. New products such as IPA contributed to an increase in the EBITDA Margin which at 25.6% in Q2FY21 was sharply higher from 9.6% in Q2FY20. With manifold increase in exports, the Company was able to maintain high capacity utilization.

While margins were sustained for Basic Chemicals, top-line suffered by 25% because of slow pick up by end use segments such as textile, oil and fuel additives and also due to temporary supply disruption. The company expects volumes and prices to pick up in upcoming months, with some traction already underway in September, as demand from the dyes industry returns to pre-COVID levels. Fine & Specialty Chemicals segment delivered a stellar performance with revenue growth

of 52% y-o-y. The business remains a star performer although capacity utilization was affected partially by COVID-19 related government mandates and short-term challenges from shipping lines. The Business is supported by a strong order book, thereby improving Q3 performance even better. For Performance Products, after having delivered an exceptional performance last year, the Company expected a normalized performance this year particularly in terms of margins. The current pandemic, however, has significantly impacted consumption thereby affecting volumes and margins. The company has seen signs of recoveries in volume and expects to achieve a normalized performance as demand picks up worldwide.

Domestic Revenues stood at Rs. 672 crore in Q2 FY21 as against Rs. 767 crore in the corresponding period last year. This was due to constraints to peak capacity utilization during the quarter.

Export Revenues were Rs. 319 crore in Q2 FY21 compared to Rs. 245 crore in Q2 FY20, higher 30% Y-o-Y. The focus was on regions that were on the path to recovery from the effects of the virus while deploying a strategy to take advantage of a depreciated currency to increase export bias. ■



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Oil India Limited commences seismic survey in Andaman Offshore - Plans for intensifying exploration efforts & exploration CAPEX



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Noida, India: Oil India Limited (OIL), India's second largest National 'Navratna' E&P Company, in terms of total proved plus probable oil and natural gas reserves, has kick started its offshore operations today in Andaman Shallow Waters with the deployment of a state-of-the-art multi-purpose seismic data acquisition vessel "SW Vespucci" for acquisition of 8400 LK of 2D seismic data in its OALP-III blocks AN-OSHP-2018/1 & AN-OSHP-2018/2. The exploration efforts in Andaman Offshore are being resumed after a long period of time. On the Onshore front, OIL was the first company to commence 2D & 3D seismic data acquisition in any Onshore OALP block in the country and also the first company to complete the

committed seismic work programme in an Onshore OALP block. This is in line with the vision of Hon'ble Prime Minister of Atmanirbhar Bharat by enhancing domestic exploration and production and reduce dependence on imports.

Shri Sushil Chandra Mishra, CMD, OIL, on the occasion informed that the company has drawn up plans to intensify its exploration efforts in the country and increase exploration CAPEX in the coming years. He further stated that the data acquisition in Mahanadi on-land blocks in the state of Odisha would begin shortly and the exploration drilling campaign in its OALP blocks would commence during 2021-22. OIL plans to carry out about 15000 LKM of 2D API, 4000 sq-km of 3D API and drill 66 wells in OALP blocks in the next 3-4 years.

OIL was awarded 21 blocks spread over Assam & Assam Arakan basin, Rajasthan, Mahanadi Onland, Andaman and Kerala-Konkan Offshore basins. Through this process, the company has consolidated its position as the leading Operator in Northeast with a total acreage area of 17000 sq km. The company has been actively participating in the OALP rounds in an endeavor to intensify exploration and is expecting two more blocks under OALP V in the state of Assam which would take the acreage position of OIL in northeast



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to over 20000 sq km. Apart from consolidating its position in northeast and Rajasthan, OIL has made conscious efforts to carry out exploration in Category II & III sedimentary basins in line with Government of India's thrust for exploration.

L&T Construction Awarded Contracts for Water & Effluents Business

Mumbai, India: L&T Water & Effluent Treatment business has secured an order from Punjab Water Supply & Sewerage Board, for providing 24x7 surface-based water supply to Patiala town. The project is part of the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme. The scope of the project includes design & construction of a water treatment plant of capacity 115 MLD, clear water reservoir, underground storage reservoir & pumping station, overhead storage reservoirs (OHSRs), raw & clear water pipelines, metered consumer connections, associated electromechanical & instrumentation, control & automation including measurement of input & output water quantity and quality through SCADA & other instrumentation works.

The project is designed to cater safe & potable drinking water to Patiala benefitting 6.6 lakh population. This is the second order from the same customer during the year and the order

adds another feather to the Water Management portfolio of the Business.

Another order has been secured from Gujarat Water Infrastructure Limited for design, construction, and operation of Navda to Chavand bulk water transmission pipeline project in Gujarat.

The scope of work comprises of construction of RCC sumps, pumphouses, supply and laying of MS Pipeline along with associated mechanical, electrical & instrumentation works. The project aims to supply additional 280 MLD of bulk water to mitigate the future demand of Amreli, Junagadh, Botad and Rajkot districts of Gujarat.

A repeat order from Bangalore Water Supply and Sewerage Board has been secured by the business for the construction of ground level reservoirs with associated mechanical, electrical & instrumentation works, along western route (CP 13) of Bengaluru, Karnataka. The project funded by Japan International Cooperation Agency (JICA) is part of phase 3 of Bengaluru water supply & sewerage project. ■



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Revival of India's Oil Economy: A Prognosis (Basis – H1, FY 21)



Dr. D C Patra

Executive Director, Planning
Bharat Petroleum Corporation Ltd

58



Research Question

What will be the shape and nature of revival of oil Industry in India from the downturn?

Background

The lockdown to contain COVID 19 transmission that commenced on March 25 passed through 5 phases of graded relaxation since May 1. Unlocking process began from June 1 and the process is unwinding unevenly across States.

Country is passing through unlocking phase 5.0.

Revival of the Industry is a much speculated debate amongst the experts. If sales of Petrol and Diesel is taken as indicators of Industry, then some interesting observations arise out of the past two quarters' sales data.

The Downturn

April 2020 happens to be the least consuming month over last 12 years (total

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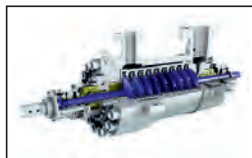


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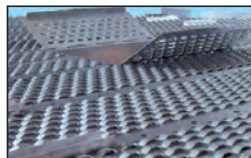
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of all products, as well as for Petrol and Diesel).

Sales contraction in terms of percentage over the same month of previous year experienced during last 6 months:

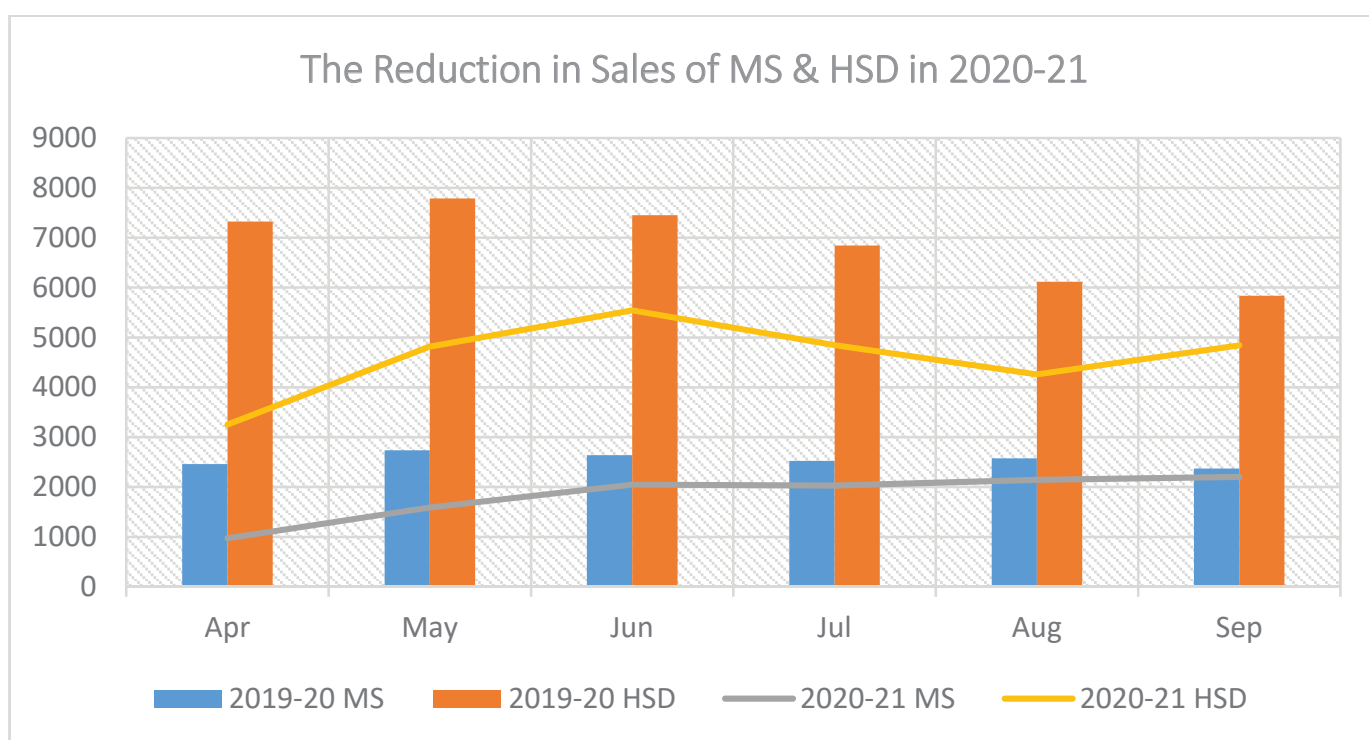
	MS	HSD
April	60 %	56 %
May	42 %	38 %
June	22 %	26 %
July	20 %	29 %
Aug	17 %	30 %
Sept	7 %	17 %

The contraction in sales experienced during past 6 months was 4.3 MMT Petrol (14%) and 13.8 MMT Diesel (17%). Though percentage loss of consumption of both the products have been gradually on the

decline month after month, it is unlikely that the consumption lost in the first half will be compensated, even partly, in the second half of the year. Graph 1 presents the reduced sales position of 6 months for the 2 products in 2020-21 over the previous year.

Revival

May 2020 happened to be the turnaround month and June witnessed the peak. Quarter II reflects the seasonality pull, compounded by lockdown impact. However, September reflects the counter seasonal turnaround. Graph 2 presents absolute value of consumption of Petrol and Diesel from April 2019 onwards, monthly time series & Graph 3 presents



Graph 1 – Loss of Sales of Petrol and Diesel in 2020-21 over 2019-20

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SIZE RANGE : 1/2" - 24"



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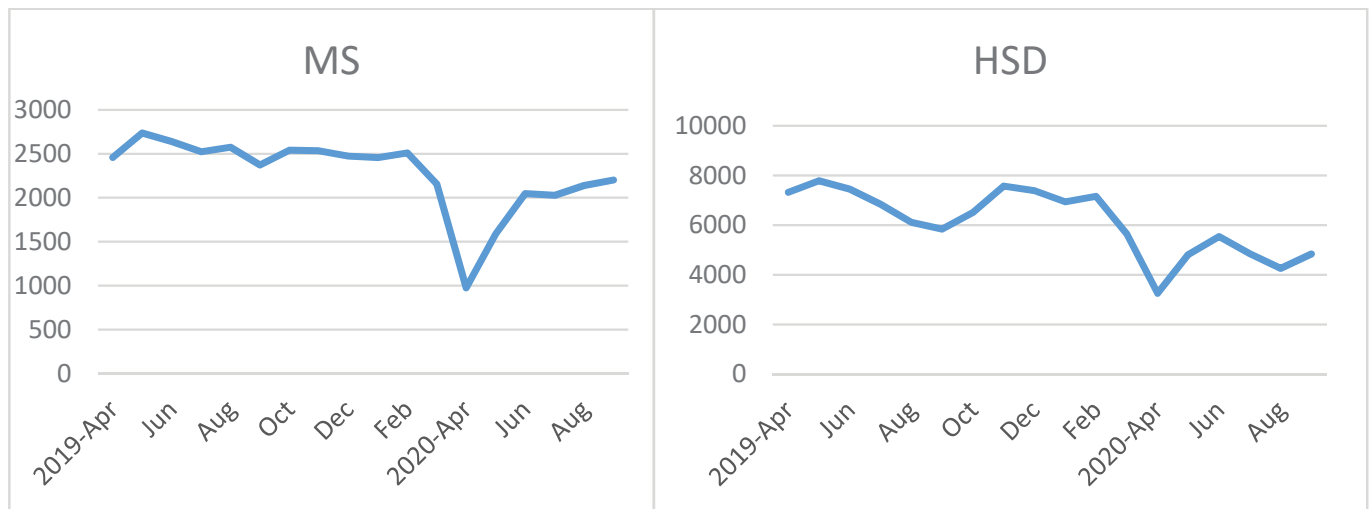
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THANE

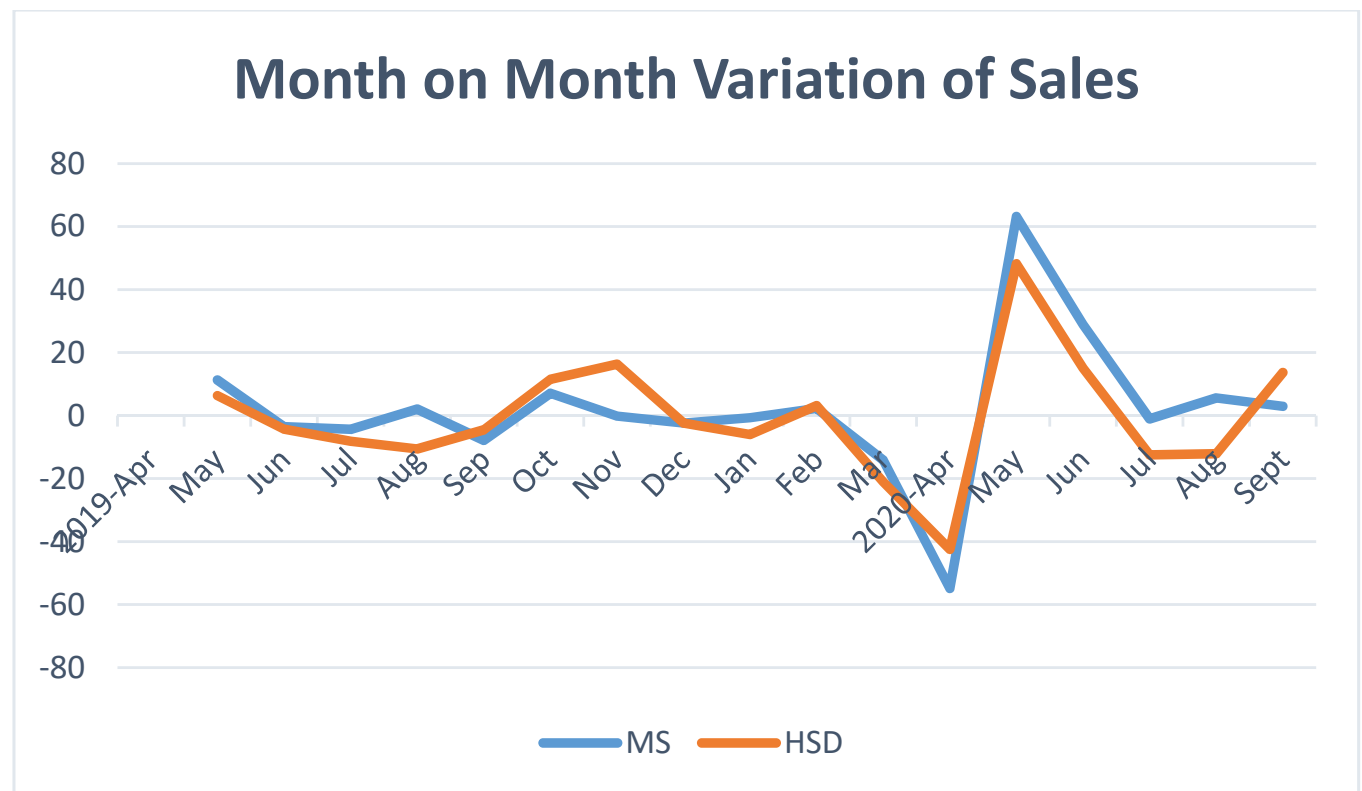
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ISO 9001:2008





Graph 2: Sales of Petrol and Diesel by PSUs



Graph 3: Growth of Sales of Petrol and Diesel by PSUs

monthly growth of consumption of Petrol and Diesel

Nature and Shape of Recovery

Petrol exhibits 'V' shaped recovery and Diesel recovery exhibits similar to 'W'

shape. While MS is touching pre-Covid level (of March '20), Diesel exhibits renewed recovery in September, the first phase witnessed in June '20. ■

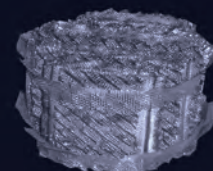
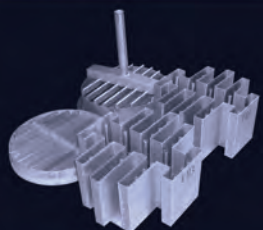
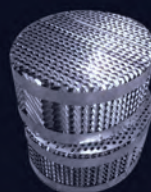
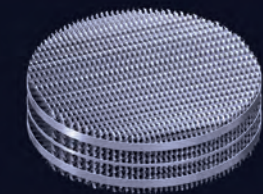
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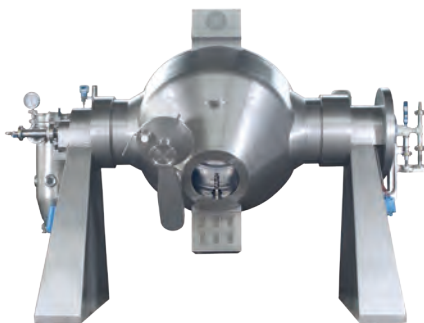
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EPC or EPCM?

When it comes to contract strategies for major projects, Engineering, Procurement and Construction (EPC) and Engineering, Procurement, Construction and Management (EPCM) style contracts are two of the key options, but which one provides better outcomes for project owners? EPC and EPCM contracts can both deliver strong outcomes; however careful consideration should be made of the different levers and potential outcomes to determine which one is best for each project. In this article Rashid Hussain explores some of the key dimensions project owners should consider in choosing their project contracting strategy.

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Engineering, Procurement & Construction (EPC) is a contract option in which the EPC Contractor is

responsible for all activities from design to procurement and construction to deliver the asset to the end user or owner. It' is also known as Design and Construct (Lump Sum Turn Key is a form of EPC). Engineering, Procurement, Construction & Management (EPCM) is a professional services appointment whereby the Contractor's services are generally to provide detailed design, procurement, construction management and project coordination necessary to deliver a project.

Why Choose EPC?

EPC contract forms are selected to realise the inherent advantages provided by an integrated team across the full life cycle of a project from design concepts through to commissioning. Traditional barriers between engineering, procurement and construction contractors (or variations of this) are eliminated and the inefficient layering of owners' management teams is avoided enabling rapid and efficient decision and approval processes. This approach seeks to achieve the most seamless delivery organisation possible. An integrated EPC team can design, procure and construct facilities safer, in a

shorter duration and with lower cost in a manner fit for the purpose specified by the owner. Budget, schedule and performance risks are transferred from the Owner to the EPC Contractor, enabling the owner to focus on the critical task of developing their business systems and processes in preparation for operating their asset.

As challenges of projects become more complex, owners can transfer risk to a company capable of delivering a complete package of resources, products, innovations and management. In addition to the above, owners routinely expect contractors to provide contemporary industry efficiencies, latest tools and practices, labour relations expertise and risk management. An EPC approach allows these deliverables to be managed under one aligned team.

We believe that the EPC approach is responsive to the critical success factors for new project development, such as:

- Creating and maintaining the highest safety standards
- Mandating and achieving an aggressive completion
- Schedule
- Integrating quality into the work from conceptual design through the final installation
- Delivering a completed project fit for purpose and at the least capital cost

Why Choose EPCM?

EPCM contract forms were traditionally

used to enable a project to progress when the scope was unclear or a risk difficult to quantify such that a contractor required to include excessive contingent allowances in the price to address the risks. These included:

- New or proprietary technologies
- Specific site or country risks
- Owner supplementing their existing delivery team

This framework has shifted in the last 10-15 years such that the EPCM approach is now prevalent, initially driven by contractors becoming more sophisticated in their risk analysis and proposing a risk-free margin. Factors that influenced this transition were:

- Surge in demand for global engineering and construction and ability for contractors to nominate risk free revenue
- Significant size and complexity of projects such that contractors could not accommodate fixed price risk on their balance sheet.
- Shortage of experienced professionals to perform the work. During this transition period an "industry" of Owner Representative companies has developed to act as the interface between the Owners and Contractors and these organisations will continue to actively promote EPCM contracts to ensure the commercial viability of their business.

EPCM contracts allow critical path

activities to continue while scope is further defined. Schedule is therefore shorter as time taken to develop basic design is not added to the critical path. It is touted that EPCM project costs are less than EPC as the contractor's fee is minimised, however the inefficiencies of layering and bureaucracy of decision-making processes in EPCM result in inefficient organisation for an extended time and higher costs result. Also, the risk remains with the client and recent performance history indicates

owners are being impacted by the advice of their representatives.

In summary, EPC is the most direct route to the least cost and highest quality contracting option, where aggressive completion schedules and commitment to peak safety standards complete the mix. The inherent accountability of an integrated EPC team naturally delivers value, and the customer realises a product that is both fit for purpose and delivers the highest return on their investment.

A Comparison between EPC and EPCM Modes of Contracting

Project Allocation	EPC	EPCM
Equipment supply and process warranties	Single warranty between Owner and EPC Contractor, usually in the form of a performance bond. EPC Contractor manages warranties with sub-contractors and suppliers	Owner negotiates warranties with each supplier and contractor directly often supported by multiple performance bonds.
Project Budget Cost overruns	The cost risk for the project is borne by the EPC Contractor	The cost risk for the project is borne by the Owner
Project Financing	Usually requires a substantial down payment by Owner to EPC Contractor generally requiring all financing to be in place at onset of project	Project financing can be any combination of down payment, accounts and/or letters of credit from Owner to different suppliers.
Performance Risk	EPC Contractor provides a single point of accountability for performance and warranty of project execution; responsible for all risk provided by contract documents (e.g. schedule, cost and quality, as well as other requirements, specific to the process, location or customer)	A common perception is that with EPCM the risk is sublet to each individual contractor by Terms and Conditions and financial hammers such as liquidated damages, although many claims focus on who influenced performance (or who owns the risk). A Project manager of prime contractor may be hired as an agent of the owner, yet unless expectations are clear, risk-sharing becomes indistinct
Accurate and timely measurement of performance	With a single contractor a uniform set of tools can be applied to record and measure performance. Reporting tools can be integrated across the project for attributes such as schedule, cost, materials, labour and quantities which enhances accuracy through an interactive database.	Depending on the size and capability of each contractor, the tools used to measure and record performance can vary from logbooks to highly automated systems. If accurate and timely performance reporting is expected, the issue rests with who bears the cost to conform these assorted tools into a consistent report for the Owner or Project Manager

Performance Incentives	From an owner's perspective there is an advantage to selecting a contractor willing to place fee at risk based on performance incentives. With EPC this can include specific milestones along the execution path such as first concrete, mechanical completion or energization but can also capture global components such as safety, cost quality and schedule	Each contractor can and should be prepared for incentives related to their specific scope of work, plus any global components such as safety, cost, quality and schedule. Incentives will be successful if they are designed to reward a contractor for exceeding expectations while penalising the same for not performing to specific goals.
Criticality of project completion schedule	One of the key benefits with EPC is that the construction cycle can begin concurrently with detailed engineering. This significantly reduces the cycle time to construction completion and allows the duration from conceptual planning to an operating facility to be condensed. As a result, schedule critical projects are best suited for an EPC application.	A hindrance to schedule compression under an EPCM profile involves the Bid-Evaluation-Award (BEA) cycle associated with construction contracts. An effective and thorough BEA cycle consumes about 6 to 8 weeks and cannot begin until detailed design is substantially complete. If the BEA cycle is compromised, schedule compression is possible however project costs will suffer as a result.
Construction work packaging	Work packaging or a single EPC Contractor can readily adapt to many forms, typically driven by scope, discipline or schedule of work. An EPC enables the team to plan the work based on the most efficient menu and sequence for prefabrication, modules, installation and start-up.	Work packages for contractors must be divided into groups based on both scope and commercial content i.e. the ability to attract a cohesive set of bids for evaluation. This may not always reflect the optimum installation process, and can also develop a rigid work process that fosters change orders from poor definition of subdivided work.
Communication of Construction issues and changes	Construction progress, information and experience flows quickly to other team members under an EPC approach. Problems are solved rapidly and results are available sooner as the interface between the E, P and C functions is connected. Cycle times are reduced and many traditional issues never occur as the team works daily as a cohesive unit.	Traditional construction contracts bind communication with formal protocol, where changes, issues and reports are accompanied with written transmittals. This provides a highly accountable record of events through the project but drives cycle time between questions and answers to lengthy intervals, It can also prevent good ideas from fruition as they get lost through paperwork.
Ratio of administrative, technical & supervisory personnel to specialists	For a project where a single contractor is responsible for EPC, the ratio of field non-manual to specialists should be 15% to 20%. This includes all site personnel such as clerks safety personnel, field engineers, QA/QC inspectors, specialist supervisors and site management. In many cases, non-manual employees can fill multiple roles, reducing the overall staffing number and associated costs.	The ratio between field non-manuals and specialists for each contract should fall within a similar bandwidth as for EPC, however between the contractor and owner (or prime) there is often duplication in management and administration. This results in a much higher cost for the larger staff, typically required to fill the void between performance reporting and contractor accountability.

Material Supply Cycle	Procurement of engineered components, equipment and bulk materials can be performed on a schedule best suited for fabrication, delivery, installation and testing. Considerations for commitment and cash flow are built into the procurement plan, and control of materials is maintained by a single source through-out the project life. Leveraged buying provides further cost savings.	Typically the owner of EP Contractor procures engineered components and equipment for EPCM projects with bulk materials supplied by either the individual contractor or available to all contractors on a consignment or stock basis. Material control becomes more complex and delays can lead to change orders or claims. Leveraged procurement does not apply well to an EPCM profile.
Modularisation of components and equipment	Modularisation of plant components and equipment should be determined by availability of qualified fabrication shops, routes of transportation and site specific conditions such as weather and terrain. An EPC contractor can review module design during the constructability process, to assure that effective integration of module issues and logistics.	If modularisation is to be applied on an EPCM project, representative(s) from proposed erection contractors should be consulted to assure effective integration of module issues and logistics. As the planning period for module design is typically well in advance of the BEA cycle for construction, it is necessary to perform this activity independently.
Benefits of innovation and efficiencies	With an EPC approach the owner has an integrated team accountable for delivering all facets of the project in a synchronous manner. It is advantageous for the EPC Contractor to foster innovations and efficiencies as any improvements between the E, P and C functions translates into most effective lowest costs project delivered in the shortest duration.	Contractors engaged in EPCM are at a disadvantage for the benefits of innovation as typically their focus is on the quickest completion of their contract scope. Willingness to accept new and innovative practices will usually be a by-product of improved fee potential. Incentives for innovations will be centred on a specific contract in lieu of a benefit to the total project.
Accountability for labour relations	EPC Contractors are responsible for the labour across the project. Effective and consistent application of labour relations is essential in maintaining respect with specialist personnel including the momentum that will deliver the project as expected.	Each contractor on an EPCM project will have their preference for labour relations and application of work assignments. In many cases these contractors will employ jurisdictional decisions that favour their operation without respect for affect to other project contractors. Owners may retain a labour consultant however it common practice for each contractor to be responsible.
Demand for Skilled Resources	An EPC contractor capable of executing substantial and complex scopes usually provides a good draw for skilled labour as the specialists view them as a stable source of work with consistent work rules. This can be critical when resources are challenged and innovative recruiting actions are necessary to meet the staffing plans for large and complex projects.	EPCM Contractors usually have good relationships with trade(s) sources as their smaller team is tailored for consistent employment through seasonal changes. This results in a strong draw for labour up to their capacity, however unless the project scope supports the dynamics of staffing multiple contractors, resource recruiting can be challenging with less manning for staffing issues.

Percentage for speciality work	An EPC Contractor is challenged executing high volumes of speciality work (e.g. insulation, roofing, pre-engineered buildings, containment liners) as both direct his specialists and the contractor's non-manual labour typically do not have the training required to install such components of systems. In such cases the EPC Contractor will hire specialty contractors to execute unique scopes of work	EPCM works well with speciality applications, where contractors possessing unique qualifications, custom tooling or particular licenses are best suited over a general contractor. The quality of work typically meets or exceeds industry standards, however schedule compression is unlikely as the administration of multiple speciality contractors is time and resource consuming.
Location of engineering team/s	Where the engineering and detailed design is performed should have minimal impact, if effective coordination and communication is established by the EPC Contractor. Efficient dialog is required early to assure constructability issues and lessons learned and incorporated in a timely manner.	EPCM can work effectively with remote engineering as contract documents should be based on a defined scope with clear bid specifications. Work can be executed in an EPCM regardless of the location of the design centre; however contractor expertise should be retained during the construction.
Management of local community and indigenous peoples	An established EPC Contractor with a formal labour relations program should be capable of executing an effective protocol for the hiring, training and involvement of local personnel. This includes developing agreements with labour leaders to provide access for indigenous people to the project and the use of non-signatory local contractors for portions of the work	Hiring local contractors can fulfil some indigenous issues however there can be uncertainty around these contractors having the skills and qualifications required for the project. With EPCM the managing contractor must validate the capabilities of local contractors to assure that owner or community commitments for local affairs do not significantly compromise project execution.
Build-Own-Operate-Transfer (BOOT) option	The BOOT option is being considered by more owners as plant development can proceed with innovative capital schemes. In a BOOT option a high degree of contractor accountability is required as the risk associated with traditional workmanship warranties is extended to include performance expectations over some period of an operating cycle.	BOOT applications are possible under an EPC'M contract, however it is more difficult and costly to align multiple contractors in a risk pattern that extends beyond mechanical completion of their specific contract. In addition, performance bonding of contractor can be a concern as for many the cost of extended risk exceeds their bond capability.



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Industrial All Risk Policy for Chemical Plants

Arun Garg & P Narayanan recommend Industrial All Risk policy for the chemical plants which offers comprehensive coverage for fires, explosions theft as well as to an extent for material damage & business interruptions. The authors point out the important clauses and add on covers that must be added while selecting the policy.

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Operating an industrial or manufacturing unit is fraught with several risks which can threaten to put a halt to business operations. Apart from trade risk, chemical plants (and fixed assets thereof) are exposed to physical loss or damage due to operational and 'Act of God' perils. Many of these hazards and perils are covered under the standard insurance policies: Fire policy, Machinery/boiler explosion/electronic equipment policy and Burglary policy. Banks and financial Institutions insist on such insurance protection from industrial customers.

The aforementioned policies are called peril policies, and perils are clearly defined. Loss or damage to the insured property due to the act of these defined perils is reimbursed as per policy terms.

Industrial All Risk (IAR): A more comprehensive policy

However, there are gaps in these policies which are insured to some extent under the Industrial All Risk (IAR) policy. This is a package policy providing cover against material damage and business



Pic 1: Peril policies: Protection against fire, explosions, and theft

interruptions of an enterprise. This policy (sum insured should be more than Rs 500mn, including gross profit) provides cover against all risks/perils other than those excluded in the policy under the following sections:

Section I - Material damage

The policy provides compensation in case the property insured is lost, destroyed or damaged accidentally other than in circumstances excluded in the policy. The insurance company will pay to the insured the value of the property at the time of

its accidental physical loss/destruction/damage, or, at its option, reinstate or replace such property or any part thereof.

The basis of valuation in respect of buildings and contents (other than stock) shall be on reinstatement value. Revaluation of gross block assets is to be done every year. Note that capex budget is to be included in the sum insured. In respect of stock, valuation shall be on market value. The insured has to make sure that all stocks stored inside and outside the plant (including 'Held in Trust') are covered.

Add-on covers make the policy a must-buy

Add-on covers	Exclusions
▪ Fee clause removal of debris & architects, surveyors and consulting engineers	▪ Collapse or cracking of buildings
▪ Clause on designation of property	▪ Larceny
▪ Omission to insure additions, alterations or extensions clause	▪ Coastal or river incidents
▪ Clause on temporary removal of stocks	▪ Cessation or delays in works
▪ Catalyst and thermic fluid cover	▪ Destruction of property by order of any public authority section
▪ Air freight and express freight cover	
▪ Ingress & digress of flood water cover	
▪ Brand protection clause	



Pic 2: Material damage: Compensation if property insured is lost, destroyed or damaged accidentally

Section II - Business Interruptions

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The policy will cover the amount of loss (or gross profit, as the case may be) resulting from business interruptions or interference in consequence of loss, destruction or damage covered under Section I, up to the limit of sum insured.

The sum insured under this section should represent the estimated annual gross profit.

Key terms

- Gross Profit – Difference Basis: Loss of gross profit due to reduction in business turnover (including increase in cost of working) because of admissible loss/damage under Section I of the policy.
- The SI-GP should be declared corresponding to the indemnity

period if the indemnity period is >12 months.

- Indemnity period: Compensation required for estimated stoppage of production in terms of months to rebuild operation or come back to normalcy 100% (generally varies from a few hours to more than years based on the nature of loss).
- Policy excess (called time excess): Minimum 7 days GP will be detected from the claim amount to avoid small losses.

Add on covers

- Extension of supplier and customer premises.
- Failure of utility services at terminal ends.

Business Interruptions – Key clauses

- **‘Departmental’ clause** : “If

the business is conducted in departments, the independent trading results of which are ascertainable, the provisions of the basis of cover in respect of any item on gross profit will apply separately to each department affected by the damage, except that if the sum insured by any item of gross profit is less than the aggregate of the sums produced by applying the rate of gross profit for each department of the business (whether affected by the damage or not) to the relative annual turnover (or to a proportionately increased multiple thereof where the maximum indemnity period exceeds 12 months), the amount payable will be proportionately reduced."

- **'Accumulated stocks' clause :**
"In adjusting any loss, account will be taken and an equitable allowance made if any shortage in turnover resulting from the damage is postponed due to the turnover being temporarily maintained from accumulated stocks of finished goods in any warehouse or depot."
- **'Goods Held in Trust' clause :** If the policy states it covers goods held 'in trust', it covers the full value

of goods. However, if the policy covers goods 'in trust for which the insured is responsible', the insurance only covers the liability in respect of goods, and not the goods themselves.

Exclusions

The policy does not cover losses resulting from interruptions of or interference with the business, directly or indirectly, attributable to the following:

- Interruption of water supply, gas, electricity or fuel systems or failure of effluent disposal.
- Any restriction or reconstruction or operation imposed by any public authority.
- Interruptions due to electronic installation, computer and data-processing equipment.
- Cessation of work/delays.
- Deliberate erasure loss, distortion or corruption of information.
- Deductibles stated in the schedule.

Our View

Industrial all risk insurance is a wider cover than the traditional 'Standard Fire and Special Peril Insurance Policy', and

guards of against disasters and sudden calamities that can bring factories to a grinding halt. The IAR policy covers a wide range of perils such as fire and allied dangers, burglary, accidental damage, breakdown and business interruptions. This cover is available with add-on covers and low premium.

We strongly recommend an IAR policy for chemical plants due to the following reasons:

- **Fire LOP (loss of profits) is covered under the policy and is required for process industry** as it operates with batch process and its business plans are based on batch/schedule dispatch orders and business commitment.
- **Opportunity lost due to unfortunate accidental losses** leads to financial losses, and cannot be compensated.
- Fire & explosion hazards are relatively more in the chemical Industry and the **period of production stoppage** on an average is more than 10 days. Hence, they are susceptible to FLOP (fire loss of profit).
- This policy will **generate confidence on new business** expansion among cliental.

- **Premium** for machinery breakdown section of this policy is **much lower** than normal premium.
- Fire section is insured on R/I value, and the **claim will be settled for new replacement value.**
- **Claim deduction** under the heading 'Under Insurance' is not applicable for cases up to 15% of Sum Insured
- There will be considerable savings in insurance premium. ■

Authors



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New Definitions of MSEs & its Impact on Procurement of Indian CPSEs



K R M Rao

Executive Director (C&P),
GAIL

77

The Micro Small and Medium enterprises (MSMEs) have been recognized as a catalyst and accepted as the engines of economic growth and for promoting equitable development. The significance of the MSMEs sector can be noted from the fact that it is the second-largest employment provider, after agriculture in India. In all, the MSME sector accounts for 8% of India's GDP and 45% of merchandise exports. It won't be wrong to refer them as the 'Backbone of the country.' MSMEs have played an essential role in providing employment opportunities in rural areas. They have

helped in the industrialization of these areas with a low capital cost compared to the large industries. We can say that India is propelling towards a robust global economy through a silent revolution powered by MSMEs.

In order to boost the Micro and Small enterprises (MSEs), Public Procurement Policy (PPP) for MSE Order 2012 was issued by Ministry of MSME which provide following benefits to MSEs in Public Procurement:

- Issue of tender document to MSEs free of cost.

- Exemption to MSEs from payment of EMD/Bid Security.
- Purchase Preference of 15% to MSEs.
- Target of 25% (initially 20% enhanced to 25% in year 2018) of total eligible procurement from MSEs. Out of which 4% and 3% from MSEs owned by SC/ST Entrepreneurs and Women Entrepreneurs respectively.

Subsequently, Ministry of MSME has developed Sambandh Portal for entry of data regarding procurement by Government department/CPSUs and Samadhan Portal for resolving grievance of MSMEs regarding delayed payments.

The earlier the criteria for classifying an enterprise as Micro, Small or Medium was based on their investment in Plant and Machinery (for manufacturing enterprises) or on Equipment (in case of enterprises providing or rendering services). However, to ensure that MSMEs continue to lead the country towards economic growth, and in

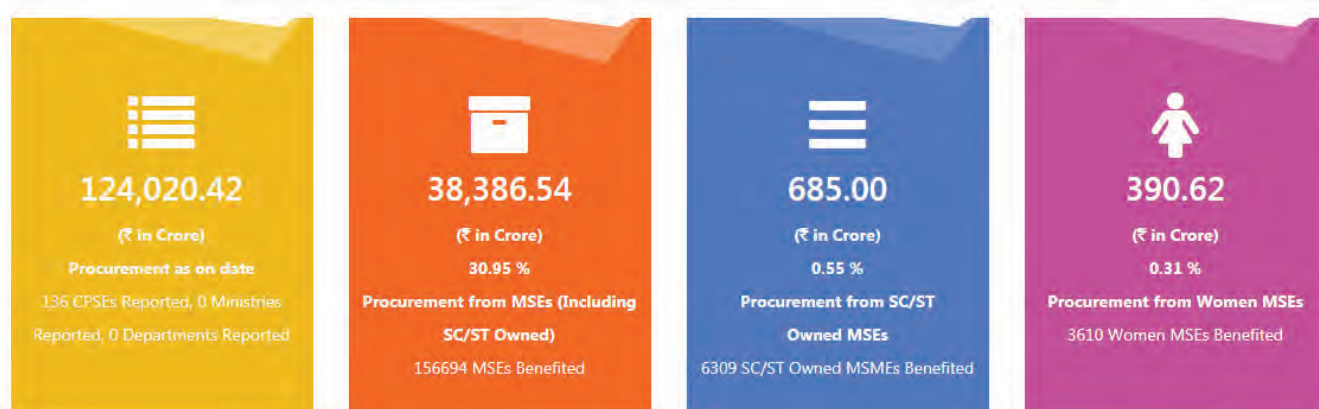
view of the economic hardship caused by Covid-19, the government has announced few schemes under 'Aatmanirbhar Bharat' i.e. Self-reliant India initiative.

Accordingly, the criterion for classifying MSME has also been revised. Under the revised criterion, the combined factors of 'Investment in plant and machinery' and 'Turnover' are required to be considered to determine whether a business should be classified as a Micro, Small or a Medium enterprise. As per the new definition, various units will now be classified as below:

- **Micro enterprises** - Investment of less than Rs. 1 crore and turnover less than Rs. 5 crore
- **Small enterprises** - Investment of less than Rs. 10 crore and turnover less than Rs. 50 crore
- **Medium enterprises** - Investment of less than Rs. 50 crore and turnover less than Rs. 250 crore

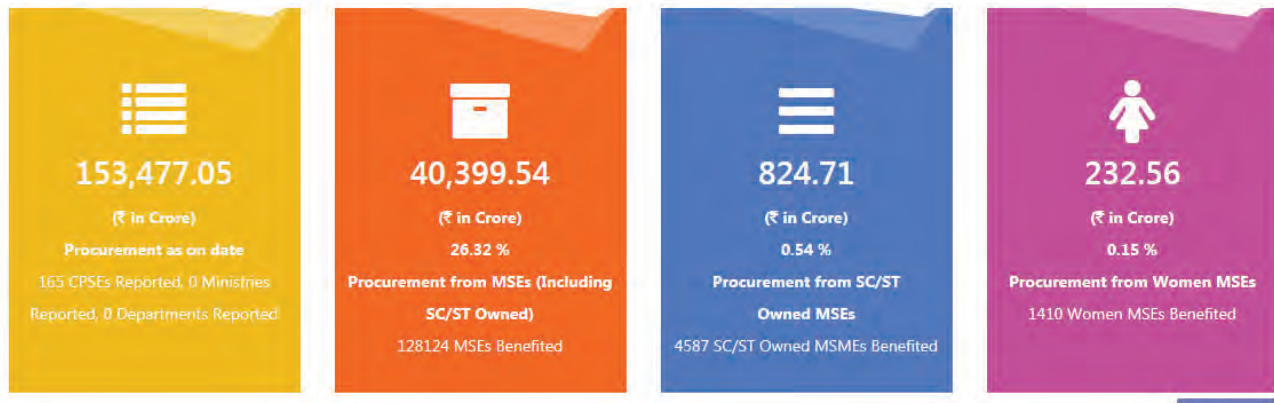
Procurement From Central Ministries / Departments / CPSEs For FY 2019-20

2019-20 ▼



Procurement From Central Ministries / Departments / CPSEs For FY 2018-19

2018-19 ▼



The above policy has been implemented w.e.f 1st July 2020 wherein all existing MSMEs and the new MSMEs are required to obtain 'Udyam' registration which is a simple online registration based on self-certification.

In earlier definition, there has been a chance of losing the entitled benefits, if a MSME outgrow its size. Therefore, MSMEs tried to remain within the definition rather than to grow. With the revised definitions of MSMEs, this worry has been addressed.

Based on data available on Samandh Portal, the details of procurement of Central Ministries/ Departments/ CPSEs for last three years are as under:

From above, it is evident that percentage procurement from MSEs by Central Ministries/ Departments/ CPSEs is increasing. But there is an enormous scope for further improvement. The procurement from MSEs owned by SC/ ST enterprises and Women Enterprises

is not upto mark. This is mainly due to non-availability of such enterprises for items/services being procured by Central Ministries/ Departments/ CPSEs and due to notwithstanding to the competitive rates quoted by other bidders. From the data available on Sambandh, it is noted that Vendor Development Program and Handholding sessions are being organised by organisations but desired results are not being achieved. Therefore, some policy changes are required by Government / Ministry to boost these category of enterprises.

The CPSEs play a crucial role in creating domestic manufacturing capabilities by leveraging proposed public procurement and projects. Further to face the competition from large enterprises within and outside, MSEs are required to respond promptly to the evolving marketing needs and innovations. There is an immediate need to be provided better industry access facilities in order to sustain and further increase its contribution towards output,

Procurement From Central Ministries / Departments / CPSEs For FY 2017-18

2017-18 ▼



employment generation and exports. Accordingly they are being advised day in and day out to visit the tenders portals of the CPSEs and Government E-Market Place (GeM) to know about the requirement, being trained on how to be a part of the stakeholder community during the various vendor meets and development programs, coached on how to submit their bids and develop themselves during the vendor coaching programs and also on how to associate themselves during the various Events and Meets organized at various platforms.

The CPSEs are also conducting Entrepreneurship Development Programs for youths from time to time to develop MSE entrepreneurs wherein they are taught the skill of trade over a structured residential program.

Also to deal with the finance problems, MSEs can utilize the various loan schemes offered by the government from time to time, use the TReDS platform for seeking

timely payments which is a growing platform nowadays and government is emphasizing on the same.

The procurements of CPSEs are now observing a paradigm shift through Government E-Marketplace portal. This digital portal is further empowering MSEs to reach economies of scale right from where they are. They can easily land in big government projects by listing their products and services on the portal. The payment realization is also visible and in controlled environment.

With its agility and dynamism, the sector has shown admirable innovativeness and adaptability to survive the recent economic downturn and recession and have lots of opportunities to grow in the future by collaborative partnership between MSEs and CPSEs. ■

Future-ready Digital SCM for EPC industry

Supply chain (Procurement) is a central of EPC and contributes towards a 50-60% of project cost. Digitalisation has transformed many industries however due to inherent issues related to the EPC industry and intricate supply chain, the design and implementation of digital solutions becomes far more complex and needs to be addressed carefully. Author discussed the three pronged approach to improve SCM through digitalization.

India is one of the world's fastest-growing economies. The growth needs to be well supported by building new infrastructure and industry. Most of these facilities are built through Turnkey contracts on Engineering, Procurement, and Construction (EPC) Basis. The EPC contractors carry out the detailed engineering/design of the project, procure of materials and services required, and finally construct project facilities.

EPC Industry, or any business for that matter, has three key imperatives which drive the success of a project. Ensuring one of the facets may adversely affect the other. Managing these effectively is crucial for success in EPC industry (Fig. 1).

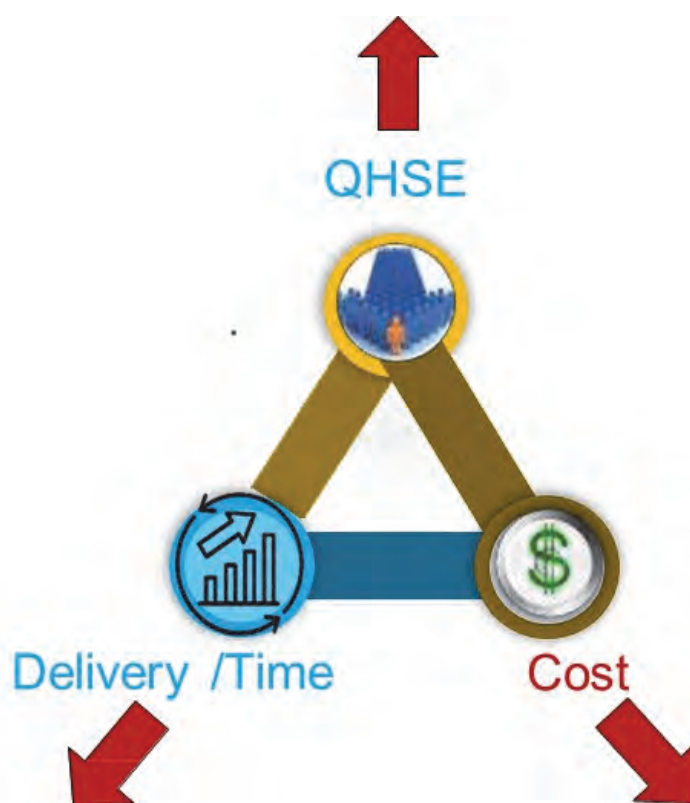


Fig. 1: Imperatives to drive success of project

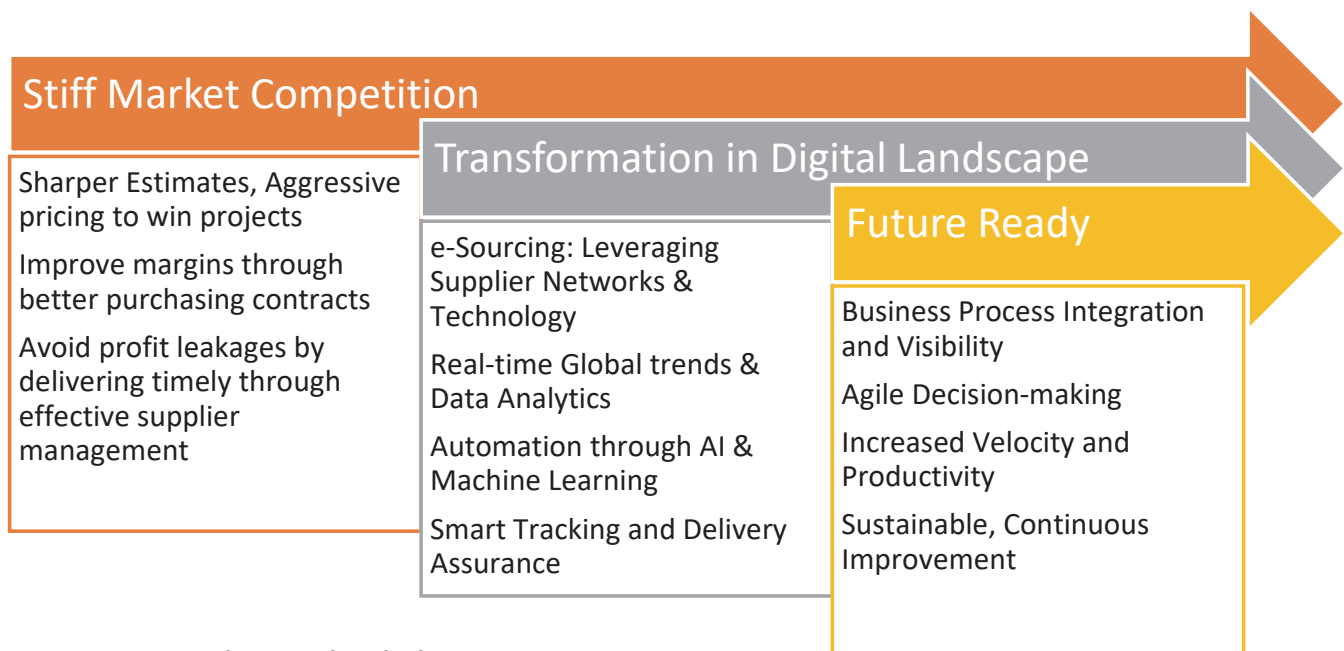


Fig.2: Future Ready Supply Chain

The Time Dimension

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Delivering projects on time is most crucial priority, as delays can put significant pressure on the budget in terms of additional manhours and liquidated damages. This in turn may hurt QHSE performance.

The need to compress the timelines, to meet the demanding customer schedules, results in concurrent Engineering, Procurement, and Construction. To avoid delay in Order finalisation, due to evolving detailed engineering and firming up of specifications/quantities, various assumptions are made for expedited procurement. However, all assumptions do not hold during the process, necessitating change management. Further, as goods are manufactured to specification

(engineered goods), they are not available off-the-shelf (longer procurement cycle times). This elevates the need for error-free manufacturing (first-time right design).

Over and above, crash procurement requirements may emerge due to late availability of design details and customer inputs or last moment changes in design. This results in tweaking of Procurement Process to meet shortened timelines. These cases may be less in value but drive project critical path.

Digital Conundrum in EPC Supply Chain

Digitalisation has transformed many industries such as finance, telecom, and retail and making impact every industry. COVID Pandemic has accelerated the

necessity of digitalisation with better implementation of virtual workplaces. However, due to inherent issues related to the EPC industry and intricate supply chain, the design and implementation of digital solutions becomes far more complex and needs to be addressed carefully.

The key in digitalising systems is repeatability and a large variance in processes makes it difficult. Due to large no. of inputs, revisions and significant variation in processes, the volume of data is not sufficient for sharp benchmarking and detailed analytics. Variations are induced due to ordering quantity changes, differing schedules, testing requirements, client specific nuances, geographical changes etc. Managing continuous design evolution/ changes is a must for successful execution.

Supply chain (Procurement) is a central of EPC and contributes towards a 50-60% of project cost. Thus, creating a future ready supply chain through process improvements and digitalisation is crucial to maintain competitiveness in EPC Sector (Fig. 2).

SCM Digitalisation Approach

Traditional procurement systems in EPC have relied upon the document exchanges during sourcing process and tracking of

the offers and ordering cycle. However, the focus is now shifting on not just tracking the ordering cycle but on the overall efficacy of the ordering process and price discovery. Digitalisation can improve SCM performance through three-pronged approach on improving cost performance (Cheaper), Quality (Better), and Speed (Faster)

As EPC contractors need to buy materials and services from worldwide suppliers, they need a system which is standardised and accepted. It is recommended that cloud-based Supply chain network platform is used for the same, where suppliers register themselves. The platform should be able to integrate with existing ERP systems of individual players (Customers as well suppliers). In effect this is a social media platform for Supply Chain community, an ecosystem for buyers as well as suppliers.

Parts of Procurement Function

- **Supplier management:** This is relatively standard process across industries. However, it is important to categorise suppliers and apply different rigour for each group. Also, it is important to identify level of rigour at each stage viz. Registration, Qualification, and Performance evaluation. While registration details



are brief and generic across groups, Qualification and Performance can be group specific and detailed.

- **Source to Contract:** Standard solutions are available to cover most processes in this function. Some major tweaks are still required to be done to address technical query cycles and managing changes in specifications/quantity. Especially in Hydrocarbon EPC industry, end-customers define the approved vendor list, it is difficult for EPC contractor to enforce its own vendor list based on experience. Customers tend to have different specifications and testing requirements for similar items and insist these materials to be bought from specific suppliers.
- **Contract to Supply:** Most EPC players rely on in-house systems, starting with

basic excel sheet templates to high-end Document management systems and workflows to cater to this part. No. of dimensions includes engineering drawings and integration of vendor inputs in overall design, Progress of sub-orders such as raw material procurement, Quality inspection standards, Logistic movement etc.

- **Supply to payment:** This is relatively standard process across industries and many digital solutions are available for managing this process. Analytics helps to drive efficiency and monitor the implementation and value realisation and this dimension is crucial while designing systems and templates.

Journey of SCM Digitalisation

The digitalisation journey is not simple and

needs to be carefully planned with a full-time core project team and strong support in the form of executive sponsorship at the highest level in the organisation. It is important to visualise what success means to all participants and ensuring that the definition of success is synchronised and not conflicting across functions. Look at SESA approach for process mapping. (Simplify, Eliminate, Standardise, Automate). Monitor intermediate milestones with relentless focus on value delivery.

Digital systems open a new paradigm through transparency and ready availability of reports in real-time thus improving overall project execution. However, process harmonisation is key at macro as well as micro-level before any implementation is taken up. The system driven approach to manage process variations is required and needs significant understanding of IT as well as business processes. Working team requires to capture information in digital format and there are always disputes on who will be responsible for the task. While efforts are always done to capture data at source using workflows, there are always missing pieces. The teams may continue to capture data in excel sheets and convincing them to use online systems is always tricky.

Driving adoption is another dimension where significant work is required. Shifting

from manual to system is easier, however in case you have existing system, the shift becomes far more challenging due to continuous comparison of old with new system. This is where drive from executive sponsorship is crucial.

Journey at L&T Hydrocarbon

LTHE has, as always, set steep growth targets as part of the perspective plan. The plan envisages significant scale up in business, without proportionate addition of resources. To achieve the business at that scale and achieve higher productivity, it is important to improve operational efficiency. Digitalisation of internal processes in EPC context is the key to maintaining this cutting edge.

L&T hydrocarbon took this journey for digitalisation of supply chain in two parts viz. SAP Ariba implementation (Project Shikhar 3.0) and consolidation of existing post order tracking systems. Ariba implementation is an example of using standard platform with limited customisation. The implementation scope included six modules viz. Supplier Lifecycle and Performance (SLP), Sourcing, Contract Lifecycle Management (CLM), Supplier Risk management (SRM), Supply Chain Collaboration (SCC) and Spend Analysis. The task force was guided by program manager and driven ported by Executive sponsor. The core

team included a full-time project manager and representative from SCM for each business unit. The team was guided by Steering committee comprising of all SCM heads. L&T Infotech was chosen as implementation partner.

The second part of digitalisation was about consolidation of existing post order systems using highly customisable, Microsoft SharePoint Server (MOSS) platform. As standard software products are not available for managing post order activities for non-standard environment, LTHE had built various systems to address specific sub-processes in Contract to Supply segment. These included VDRS (Vendor Document Register System – for vendor engineered documents), VDM (Vendor Delivery Management – for monitoring progress of vendor sub-ordering and manufacturing), Quest / ICMS (for monitoring quality inspection calls, inspection release notes) and ILTP (Integrated Logistics Tracking Portal). As part of integration, single interface was created to ensure that all users including supplier have seamless experience across different sub-processes. System architecture was also tweaked to allow limited flexibility to buyers to manage variations across categories / projects while maintaining core process. This system is smoothly dove-tailed with the SAP Ariba system.

Conclusion

Typically, digitalisation happens in significant spurts at intervals with incremental developments in-between. These quantum jumps need to be managed well for proper design as well as adoption. It is important to identify whether you wish to go with standard platform with limited customisation or completely customised platform. While in short-term, customised platforms offer better fit and easier user acceptance and also may be quick to implement. However, it is important that the evaluation is done keeping in mind the long-term business volumes, assured technology upgrades and updates for changes in legal and taxation frameworks. As saying goes “You can’t do today’s job with yesterday’s methods and be in business tomorrow”, It is important to update the methods, refine them using SESA principles and implement with wider adoption. ■

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Rolling the Dice in Chaos:

The prospects of investment in the gas industry



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As stated in the Declaration of Malabo at the 5th Summit of Heads of State and Government of the GECF Member Countries, in order to sustain the security of demand and supply of natural gas, it is necessary to ensure sufficient investments through the entire gas value chain among all gas market stakeholders [1].

Since the start of 2020, every aspect of the global economy, including investment projects in natural gas industry, have been strongly hit by the outbreak of the Covid-19 pandemic. In fact, it is always a

challenge to develop an accurate short-term forecast for tactical decisions, as bias forecast integrity will result in deeper problems. In that context, many gas investing companies have been forced to revise their 2020 capex investment budget by approximately 25% in comparison to the investment plans that had earlier been sketched for the entire year. For instance, Royal Dutch Shell announced that they plan to slash the oil and gas assets by up to USD22 billion [2], or ExxonMobil plans to reduce its 2020 capex by 30% to USD23 billion [3].

Nobody expected at the beginning of the crisis that this phenomenon could spread with such an alarming speed and cause economic activities to come to a near standstill. The trade-off between society's health and economic growth through imposing restrictive health measures has already brought global investment to its knees by having immediate effects and lasting consequences. In response, policymakers have issued investment plans to incentivise foreign and domestic investments during this harsh time, and also to protect ongoing projects from any progressive collapse.

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The number of factors that were not predictable at the beginning of the year influenced the investment decline, including global economic stress, practical barriers on the way to projects implementations, and problems that occurred across the supply chains such as interruption and delays that resulted mainly due to the pandemic.

The investment opportunities in the gas industry are shaped by upstream activities and trade infrastructure including liquefaction, pipeline, and regasification as midstream. Prior to 2020, the historical upstream investment between 2010 and 2019 was nearly USD800 billion worldwide, indicating a tremendous accumulative increase of 78% compared to the investment volume during the 2000s. A further USD310 billion investment was made on gas transportation and trade

infrastructure between 2010 and 2019, showing an increase of 67% compared to the investment made between 2000 and 2009 [4].

One of the key factors that explain the dramatic growth in global gas investment during the 2010s, was the U.S.' ambitious production plans of shale gas from unconventional resources. In 2012, the U.S. outpaced Russia for the first time since 1982 in gas production due to intensive investment in shale gas exploration and production. Between 2012 and 2019, around USD510 billion investment was made in upstream gas activities in the North American region, representing 64% of global upstream investments in the past decade [4].

The current pandemic crisis is not an emerging challenge for the energy sector investment, as this sector has already experienced another chaotic situation in 2008 when the financial crisis drove down energy investments considerably worldwide. Though, for the second time in this century, the gas industry is experiencing a muddled situation in the 2020 pandemic, which is much larger and widespread than the one that happened in 2008.

It is apparent that the effect of the pandemic on gas investment is significant in the short-run (2020-2022), due to two intertwined issues:

First, there are concerns raised by

investors regarding the level of gas demand. Thus far, the pandemic has had an abrupt shock on the worldwide economy which has shrunk demand for natural gas. Currently, the uncertainty regarding when the pandemic will end is fuelling investors' hesitation for supporting new projects.

The second issue focusses around natural gas prices, which are already lower compared to the pre-crisis period along with oversupplied gas markets. The risk of storage levels nearing capacity may even cause negative prices due to uncoordinated responses from sellers, traders, and other middleman suppliers. There are signals coming from the European gas storage inventory that oversupply may hit the capacity and substantially impact global gas market prices. That being said, according to the Gas Infrastructure Europe at the end of August 2020, the European gas storage was at 91.46% of capacity, compared to the five-year average at about 78% [5].

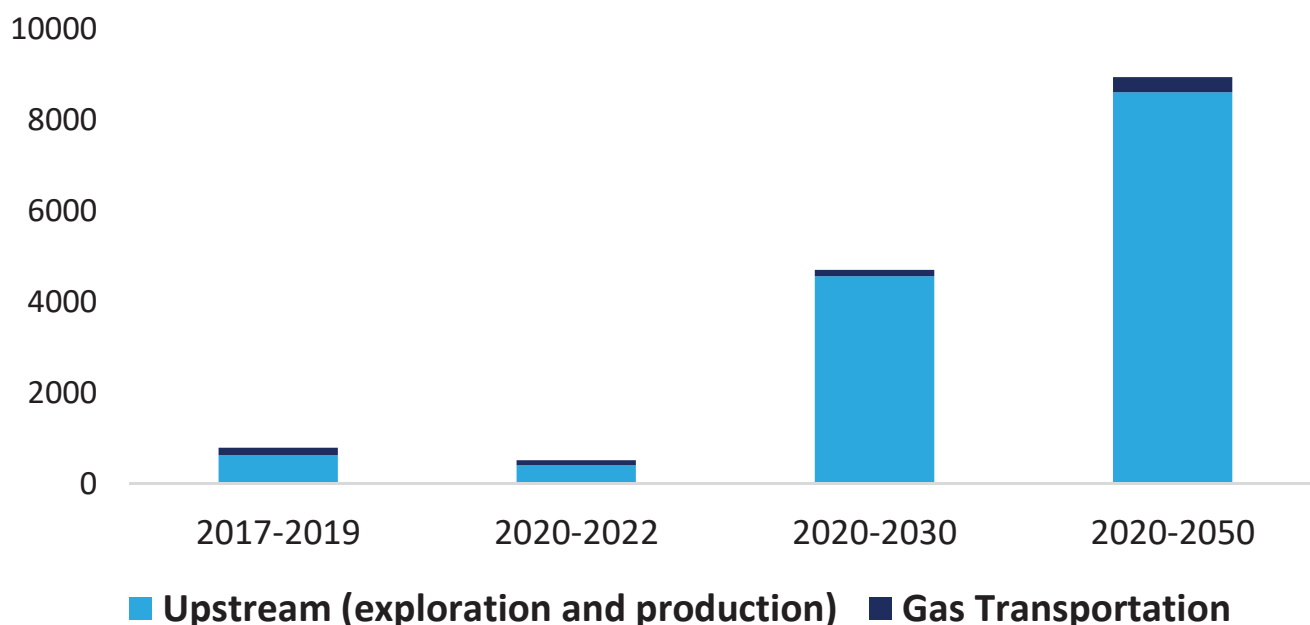
Although global investment on the gas markets have slowed down however, according to the GECF forecasts the long-term prospects for gas investment are promising, with some uncertainties:

- Traditionally, growth in demand has been a major factor influencing gas investment both in upstream and trade infrastructure. Nonetheless, in the last few years, the LNG industry

has witnessed changes in its project financing structures due to dynamic factors such as ample unconventional sources, and emerging technologies in exploration, and exploitation phases such as floating liquefied natural gas (LNG) terminals to name a few. Advanced technologies increase production efficiency through facilitating economies of scales. This causes capex reduction which provides monetary incentives for investing companies to sanction new projects

- However, in the future a project's financing for the LNG markets can be structured differently than it was prior to the aforementioned factors. The future financing structures of LNG projects require more innovation and flexibility, as the market could become increasingly fragmented
- Furthermore, there is an expected growth in LNG consumption in the coming decades because of population growth, growing economic prosperity in developing countries such as China and India, favourable government regulations, and actions to reduce air pollution

Although the growth in demand drives an increase in gas investment, LNG development projects may be difficult to finance in the same way as was common before the current crisis due to prospective



Historical growth and prospects of gas investment for short-, medium- and long-term (\$ billion)
Source: GECF Secretariat, based on data from the GECF GGM

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market changes. It is less likely that in the coming decades LNG projects will be financed by project-level debt (e.g. Canada LNG) which requires long-term sales and purchase agreements [6]. This will increase offtake capacity agreements to secure LNG investment in the short- or medium-term.

To summarise, regardless of the financing structure changes due to market uncertainties, the GECF sees that the level of investment in upstream and midstream activities is expected to grow in the medium-term (2020-2030) and long-term (2020-2050) by over USD4,700 billion and USD8,900 billion, respectively [4].

According to the GECF Secretariat and based on the latest autumn update of its Global Gas Model, world gas demand will increase to more than 5,800 bcm in

2050 [4]. An era of diminished investment on natural gas value chain will create a shortfall in production levels, and hence more cooperation is needed to support investments through the entire gas value chain to meet rising demand. ■

References:

- [1] Declaration of Malabo, Fifth Summit of Heads of State and Government of the GECF Member Countries. Malabo, Republic Equatorial Guinea, November 2019. Available at: https://www.gecf.org/_resources/files/events/declaration-of-malabo---fifth-summit-of-heads-of-state-and-government-of-the-gecf-member-countries/gecf-malabo-declaration---5th-gas-summit.pdf
- [2] Reuters, Business News, June 2020
- [3] ExxonMobil Newsroom, April 2020
- [4] The GECF Global Gas Model: <https://www.gecf.org/gas-data/gecf-global-gas-model.aspx>
- [5] The Gas Infrastructure Europe (GIE): <https://www.gie.eu/>
- [6] Canada Energy Regulator, February 2020

A Robust Growth Strategy for 2030 with Intermediate Milestones

*With Crude Oil prices persistent at low price range, we can foresee an inevitable change in the Hydrocarbon industry. Intense competition, low and flat demand, technological challenges, decreasing investor confidence and increased demand for more environmentally friendly fuel are few major challenges. "In spite of all these, we at OIL are confident about our unparalleled strength of longest experience in E&P business in the country and looking for further growth in the coming days", **says P K Goswami, Director Operations, Oil India Ltd.** in an exclusive interaction with Chemical Engineering World.*

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P K Goswami
Director Operations
Oil India Ltd.

How do you see the hydrocarbon industry shaping up in the near future after the biggest drop in the oil prices? As the 2nd largest National Exploration company in India, which are the biggest challenges that the oil producer have to address & how are you preparing for the Indian & international businesses for the future?

The dawn of shale, excessive supply, and rising cost of exploration & production, have all contributed to poor returns. While crude oil prices were going through an all-time low, COVID 19, one of the worst health crises of the century hit us. Crude oil has since then passed through an unprecedented demand drop duly accelerated by Covid 19. With the Lockdown measures are in place in numbers of countries and territories, and the transportation sector has slowed down everywhere. With Crude Oil prices persistent at low price range, we can foresee an inevitable change in the Hydrocarbon industry. Intense competition, low and flat demand, technological challenges, decreasing investor confidence and increased demand for more environmentally friendly fuel are few major challenges. In spite of all these, we at OIL are confident about our unparalleled strength of longest experience in E&P business in the country and looking for further growth in the coming days.

As the 2nd largest National Exploration Company in India with a long legacy, we see four major challenges. First is to remain competitive by increasing operational efficiency, second one is appreciation from existing mature assets, third challenge is the discovery of new fields and fourth one, addressing the Stringent Environmental concerns.

To prepare for the Indian & international businesses for the future we as a company have planned to change our current archetype. Based on our past proud legacy of being the 1st hydrocarbon company of the country we shall aim to carry safe and profitable operations under the toughest of conditions both nationally and internationally. Our key strengths which we are proud and shall take benefit of –

- Operational excellence - over 6 decades of experience in operating assets
- International presence - stake in 13 international blocks
- Presence across the Oil & Gas value chain - stake in NRL, BCPL
- Strong financials
- Strong in-house technical expertise across all functions

Further OIL is also fully committed in its support to Government of India for 10% import reduction in the country.

Please share insights into the ambitious plans for the future including fast tracking of exploration in Arunachal Pradesh and developing Baghewala heavy oil field in Rajasthan besides strengthening OIL's presence in other sectors of the hydrocarbon industry as announced in the recently held AGM.

The Ningru PML located in Arunachal Pradesh was re-granted to OIL in July 2018 after a gap of fifteen years. Kumchai is the major discovered field in the PML. Kumchai field is currently producing 75 m³/day of crude oil and 0.12 MMSCMD of natural gas. OIL has identified encouraging upside potential in the Block. It is envisaged to drill about 15-20 wells to explore and exploit the field. An additional production of 500–750 m³/day of crude oil and 0.8-1.5 MMSCMD of natural gas is expected from the field from Arunachal Pradesh.

Heavy oil was discovered by OIL in the Infra-Cambrian Jodhpur Sandstone in the Baghewala area of Rajasthan in 1991. The heavy oil (14° – 17° API) has very high viscosity and is not producible by conventional production methods. Cyclic Steam Stimulation (CSS) Pilot Project has been successfully implemented in this heavy oil field during 2018. The field is currently producing ~200 bopd of crude oil. OIL has plan to drill another 20 wells

in Baghewala to increase production of heavy oil.

The successful induction of CSS, the first of its kind in India, OIL has claimed a major breakthrough for extraction of heavy crude oil from Jodhpur Sandstone and full-scale production of heavy oil discovered from the oldest sedimentary rock of Rajasthan is now becoming a reality. The success also unlocks opportunity to test the CSS Technology in Upper Carbonate which is having a huge resource potential. Similar pilot project would be planned to establish and convert blocked up resources of Upper Carbonate to producible reserve that could secure the company's future for a substantial period.

Oil India has recently announced exploration of offshore assets in Andaman. Tell us about plans to intensify exploration efforts & exploration CAPEX.

Oil India Limited has been awarded with two OALP blocks in Andaman shallow waters. OIL plans to acquire about 8400 GLKM of 2D seismic data and drill 8 wells in the both blocks as part of Committed Work Program. OIL has started 2D seismic data acquisition work in Andaman on 08.10.2020 and so far has acquired about 2450 GLKM.

Out of the total capex of about INR 3877 crores for 20-21 we shall be committing around 50% towards Survey and Exploration.

Key Infrastructure Projects of Oil India Ltd.

Creation of Secondary Tank Farm:

Creation of Secondary Tank Farm of Crude Storage Capacity 40,000 KLS with Dehydration Facility 13,000 KLPD to achieve BS&W content <0.15 % and ETP of capacity 7020 KLPD. EDC-31.12.2020

Construction of 5000 KLPD Effluent

Treatment Plant at Tengakhat: Creation of an Effluent Treatment Plant (5000 KLPD capacity) with a view to ensure stipulated guidelines and maintain parameters of produced water by its treatment prior to its disposal or reinjection. EDC 15.01.2021

Up gradation for Enhancement of Pumping Capacity of Barauni-Bongaigaon: Guwahati sector of NBPS (UGPS- Phase II) : Phase-II project, OIL intends to augment the capacity of the pipeline up to maximum possible throughput by upgrading pumping stations, taking PS-7 & PS-9 inline to satisfy the enhanced crude oil demand of the Bongaingaon refinery as well as Guwahati refinery. EDC 30.04.2021

Pipeline Rehabilitation Project of 575 Kms (Phase I) Purpose of the Project:

Rehabilitation of the pipeline by carrying out coating refurbishment and redesigning Cathodic protection system with the objective of ensuring continued safe and reliable operation and enhancing the life of pipeline system by about 30 years. EDC 31.03.2021

Construction of new Gas Compressor Station (GCS) at Makum: Gas

Compressor Station(GCS) at Makum is required to be constructed for providing high pressure dry gas for gas lift operations in an around Makum field of Oil India Limited. EDC 30.11.2020 (Mechanical Completion)

Construction of 762 mm Gas pipeline from Baghjan to CGGS, Madhuban:

To transport the additional gas projected for production from Baghjan field, Oil India Limited is proposing to lay a 762 MM (30 inch) diameter, 40 KM (approx.) long Natural Gas pipeline starting from Baghjan to CGGS, Madhuban, Duliajan. EDC 31.12.2020

Development of Surface Facilities at Nadua and East Khagorijan in the

state of Assam: Development of Surface Facilities for Production and Evacuation of Crude Oil and Natural Gas from Nadua and East Khagorijan to enhance Production. The project consist of Modular Oil Collecting Station(OCS) at Nadua, and Modular Group Gathering station(GGS) at East Khagorijan. The OCS at Nadua will be connected to 15 HP wells and 15 LP wells and expected to produce 1200 KLPD Oil, 0.2 MMSCMD Gas and generate 800 KLPD Water. GGS will be connected to 06 HP wells, 06 LP wells and 06 Non associated gas wells and expected to produce 1000 KLPD Oil, 0.1 MMSCMD Gas and generate 800 KLPD Water and 1 MMSCMD NAG . EDC: 15.04.2021

Few more projects are also expected to come in a short time.

What are the major strategic initiatives taken by the organization to bring down the cost overruns in projects?

Few of the Strategic initiatives take by OIL are - Realistic cost estimates, Realistic timeline, Reduction of unplanned costs, Reassessing Project Difficulties or complexities, Relentless monitoring including 24 x 7 surveillance at project sites, Addressing project delays, Proper Risk Management.

What is the digital roadmap for Oil India Ltd? How do you plan to leverage this to unlock potential across – production, exploration & drilling, safety, asset optimization, project management & building an agile enterprise?

Digital culture in Oil India Limited is not new. With introduction of computers for seismic processing / interpretation system it has embarked upon its digital journey since late 70's. Also over the period of time, as per need of various activities / functions many digital technologies are implemented in the Organisation. Accordingly, OIL has state-of-the art SAP-ERP system, HPCC, VRC etc backed up by robust ICT network.

In recent years, Oil India Limited has embarked upon its digital transformation journey to become a digitally driven agile company. With five digital themes – Intelligent Production , Smart Exploration and Drilling, Safe and productive workforce, Project and supply chain

excellence and Agile Enterprise, OIL is in the process of implementing digital initiatives of modern age. Aim is towards leveraging the effective fit-for-purpose digital technology unlocking potential across the five digital themes.

In the name of Project "DRIVE" (Digital Readiness for Innovation and Value in E&P), OIL is in the process of creating its digital roadmap with digital vision. 11 (eleven) initiatives were selected for immediate implementation. The 4 guiding principles used as the basis for prioritization of the digital initiatives for implementation are STRATEGIC IMPERATIVE, DIGITAL MINDSET ACROSS FUNCTIONS, TANGIBLE BUSINESS VALUE, EASE OF IMPLEMENTATION

How is Oil India Ltd aligning to realize the Atmanirbhar Bharat Abhiyan announced by our Honourable Prime Minister? Tell us about the role of INDEG – the newly established division.

Being a technology intensive upstream E&P company, OIL India Ltd needs a wide range of equipment, accessories, plant & machineries, spares & consumables both of indigenous and imported origin for carrying out drilling, production, geophysical data acquisition & processing, transportation of crude oil and natural gas and other related activities. Most of the equipment used in oil and gas exploration and production activities are highly specialized, sophisticated and capital

intensive and OIL procures these items through GTE (Global Tender Enquiry). Therefore, it is indeed a very challenging task for OIL to develop these goods, equipment, and software indigenously to avoid Global Tender Enquiry (GTE) and extend OIL's cooperation to the dream of the Nation to become self-reliant and self-sufficient.

In order to roll out the "Atmanirbhar Bharat Abhiyan" campaign in Oil India Limited and to develop indigenously oilfield specific product, a new department named INDEG' was created on September 1st 2020. The role of this department will be to support Hon'ble Prime Minister's Atmanirbhar Bharat Abhiyan from all aspect. The primary responsibilities of the department will be

- To identify areas specific to OIL where Indigenization can be promoted.
- To deliberate on the scope of foreign manufacturing factories in India.
- To identify products with both Indigenous and Global Supply Source.
- To short list materials which are produced exclusively from foreign source.

Accordingly, OIL's INDEG has prepared its road map and plan of action. OIL & ONGC have jointly identified some items where there are none or single Indian vendors/

manufacturers of products. To realize the efforts in new vendor creation, it is considered that jointly some 25 odd items (ITEMS INVOLVING LOW TECHNOLOGY) are selected for development in the 1st phase of the development exercise. The main thrust has been given on Drilling, Production and Chemical related product as E&P Company. Recently OIL & ONGC have jointly arranged webinars for those selected items along with the probable Indian vendors, MoP&NG to make the campaign successful.

What are your thoughts on the revised MSME policy of the government to encourage the players to participate in the PSU projects? What are the steps your organization is taking to engage with this sector very effectively?

Earlier MSME vendors were categorised based on the investment in plant and machinery or equipment. However, vide Gazette Notification No. CG-DL-E-01062020-219680 dated 01.06.2020, the Classification of Micro, Small and Medium Enterprises were amended to incorporate the turn over criteria as under- As per MSME Ministry's FY19 annual report, the MSME sector is dominated by micro-enterprises as under:

Updated MSME Definition		
Type of Enterprise	Investment	Turnover
Micro	Rs. 1 Crore	Rs. 5 Crore
Small	Rs. 10 Crore	Rs. 50 Crore
Medium	Rs. 50 Crore	Rs. 250 Crore

MICRO	99.4%
SMALL	0.52%
MEDIUM	0.08%

With the implementation of new categorization of MSME taking into consideration of Turnover criteria, more and more MICRO vendors will now shift to Medium Sector and the benefits extended to MSE vendors can be availed by the MICRO industries having turnover value less than 5 Crore which otherwise would have been availed by MICRO enterprises having turnover even more than Rs. 5 Crore. Since MSME vendors are considered as backbone of Indian Economy, the new classification of MSME vendors will encourage the MICRO vendors to participate against any Government Project and will fulfil the vision of Atma Nirbhar Bharat.

Steps taken by OIL to encourage MSME vendors to participate against OIL's tender

1. Oil India Limited is organizing Vendor Development Programme (VDP) and also participated in National Vendor Development Programme organized by various organizations like MSME-Development Institute, CII etc. where MSE vendors including SC/ST and Woman vendors are encouraged to participate against OIL's tender. The year wise VDP are as under :
2. A dedicated slot has been created in OIL's website www.oil-india.com

2015-2016	2 Nos.
2016-2017	7 Nos.
2017-2018	7 Nos.
2018-2019	14 Nos.
2019-2020	06 Nos.
2020-2021	01 No. (Webinar)

for MSE vendors which contains the following :

- All the tenders floated exclusively for MSE vendors.
 - List of materials used by OIL with yearly estimated quantity and value which may be manufactured by MSE vendors.
 - OIL's Annual plan for procurement of goods and services from MSEs.
 - Vendor registration/enlistment process.
 - List of items to be procured exclusively from MSEs.
3. Oil India Limited has been timely uploading the requisite data in the MSME - SAMBANDH portal <https://sambandh.msme.gov.in>. Annual procurement data is uploaded in OIL's website and website link is provided in MSME - SAMBANDH portal from where it can be accessed also
 4. The MSE vendors registered in MSME Sambandh Portal are guided properly to participate against OIL's tenders.

How is the organization going about the Growth & Reorganization program? What are the future plans of organization?

OIL is committed to grow in the coming days. We always promise to live up to all the expectations of our stakeholders including the Government and financial institutions. Our major fields being from North East India, we have a special concern for the development of the people in the area by generating more opportunities for livelihood. In view of the competitive nature of hydrocarbon business we are ready to come out of our comfort zone and absorb strategic thinking into our business. We have planned unfathomable organisational restructuring by bringing about radical changes in our exploration and production portfolios. The elements of our future growth and reorganization includes an ambitious plan for quantum jump in production , a robust growth strategy for 2030, with two intermediate milestones at 2020 and 2025, developing right organization structure, culture and talent management systems and gender balance and designing world class workflows and processes. ■

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Waste to Wealth : New Kid on the Block

Sathiamoorthy Gopalsamy, Managing Director, Tecnimont Private Limited (TCMPL), India articulates, "We have always been immense conscious about our contributions in the local market wherever we operate and in India we have always reiterated our commitment to support the industrial and technological development of the Country." In an exclusive interview he shares company's future plans and recent diversification into the field of Green Chemistry , Carbon Capture & Waste to Wealth.

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Sathiamoorthy Gopalsamy
Managing Director
Tecnimont Private Limited (TCMPL)

Please appraise us about the highlights of latest advancements, main activities & performance of your company in the last year. How Tecnimont operations in India were impacted by the pandemic and how did the Company overcome the lockdown?

The Group has benefitted from the growth in both public and private sectors which we have witnessed in the last several years, where both public and private sectors have invested heavily in this industry. The synergies between Tecnimont Private Limited and our Group Companies Tecnimont S.p.A., Group's main contractor and global leader in petrochemicals plant engineering and Kinetics Technology, process engineering contractor and licensor in the refining sector have put us in the strategic position to obtain the maximum benefit from this elevated demand in the sector.

Maire Tecnimont Group, of which Tecnimont Private Limited is a fully integrated part, has invested immensely in its people which are the most important assets of our organization. This strategic investment in people and digital infrastructure have helped us react to this pandemic with zero impact on our project delivery and making each employee a resilient stakeholder within the Group.

Through our seamless digital network between our international engineering hubs, where Mumbai is the main

Engineering Center of Excellence, Maire Tecnimont provides clients with services and know-how ranging from conceptual studies, through technology selection, to process engineering and detailed design up to the execution of full EPC turn-key projects with a strong commitment to quality, health, safety and the environmental standards. Our inclusive 'Work from Home' policy have effortlessly managed to deliver effective business synergies and cross-fertilization within the Group's network of companies, leveraging all our skills and specializations amidst lockdown.

Tell us about your key ongoing projects & ones in the pipeline in India. How are you coping- up with the project delays?

We have several ongoing projects in India which includes Hindustan Petroleum Corporation Limited (Hydrogen Gas Unit), two projects at HPCL- Mittal Energy Limited subsidiary and some projects led by our Electrical & Instrumentation Division. We are following several prospects tendered by the Public Sector and we are confident to seize opportunities that best fit with our strategy. We as Tecnimont Group implemented Work from Home for employees across hierarchies even before the Covid-19. The Group's focus on Smart Working (working remotely, from home or from the place that ensures the best operating performance) since several years was a thought ahead of time and it was immensely instrumental for

implementing Work from Home with such ease.

Construction department did face some challenges initially owing to the physical social distancing norms and Government guidelines but were resolved with stringent Health & Safety process along with effective and diligent implementation of Government policies. We have achieved major milestones in all our projects and managed to adhere all project timelines to avoid any major delays by demonstrating strong customer centric approach towards our prestigious clients by proving how to comply with deadlines without compromising on quality standards in these difficult times.

The Group has diversified presence in the field of Green Chemistry & Circular Economy. What is the rationale behind this initiative and the kind of opportunities available in this domain globally as well as in India?

The core thought-process behind creating NextChem under the umbrella of Maire Tecnimont is the global drive to support the on-going energy transition. Presently almost all the major Private & Public Sector Companies are thinking on the lines of Green Chemistry and or Circular Economy initiatives. Government is also giving full thrust on this subject. Surely, it's a future to create Wealth from Waste and we are currently developing many more technologies for Green Chemicals like

TCMPL India has several ongoing projects in India which includes Hindustan Petroleum Corporation Limited (Hydrogen Gas Unit), two projects at HPCL- Mittal Energy Limited subsidiary and some projects led by our Electrical & Instrumentation Division. The organization following several prospects tendered by the Public Sector and is confident to seize opportunities that best fit the strategy.

Green Ammonia, Green Methanol, CO₂ Capture etc. India offers immense potential in this field and the factors that will drive the growth are:

- **Enormous daily waste generation due to high population:** All the Municipal bodies are struggling to dispose of the same. NextChem has an Integrated solution to handle and to create value added products out of this Municipal Solid Waste. By that we can solve the problem of its disposal also can generate the lot of wealth.

- **Abundance of agriculture land and its production:** India qualifies for one of the ideal destinations for biofuels from biomass. We have abundance of raw material availability in India, where in India is still struggling for the commercially proven Technologies and a professional approach. NextChem has announced a worldwide commercially proven Technology for 2G Bio Ethanol Plants. Indian Government has already mandated 12 nos. of 2G Bio Ethanol Plant in India, therefore NextChem would be perfectly fit to support the endeavors of Indian Government with our capability of Technology & EPC Services. Similarly, in case of plastic upcycling, India has tremendous potential, and NextChem has Technology & capability to industrialize this potential. With our technological edge we can lead as a torchbearer for this sector when it comes to providing technology and know-how to enable the energy transition through green chemistry and circular economy

What is the innovation model of TCMPL to explore inventiveness and resourcefulness, how are you translating this in Indian operations?

The innovation of inclusive synergies between our Milan and Mumbai operations have created a unique model for all Group Companies. This is a fact that we are an

Indo-Italian Company with Technological edge that can count on the International network of Maire Tecnimont Group, and at the same time play a leading role in the Indian market. This advantage is not only restricted towards the engineering services, but it also provides us an edge for delivering excellence in the supply chain of engineering services, sub-contractors and suppliers along with the sustainability of our work.

Contractor of the Future

We at Maire Tecnimont Group had a well-defined Digital Strategy which includes focusing on the areas of Artificial Intelligence, IoT, Virtual Reality, Augmented Reality, Geo-spatial enterprises and Cyber Security along with embracing a Smart working culture and digital operations for across companies. We leverage our capacity for digital innovation to become «contractor of the future». Our goal is to increase our ability to govern technological disruptions, market discontinuities and clients' evolving needs, increasing value for all our stakeholders.

We have adopted digitalization across domains and have finalized our new smartworking approach much before the pandemic, so that we were ready to proactively react to the new scenario caused by COVID 19. TCMPL has been a part of the major digital shift and has adopted the smartworking model where

100 percent employees are seamlessly connected digitally maintaining the same quality standards delivery output. Our pioneering approach, processes and organizational model made us adaptive enough and ready to manage all situations and any even the most unfortunate events like Covid-19 outbreak. We have enabled our valuable teams to “work smart” in a very effective approach, combining the strict adherence to prescriptions by the Authorities with the relentless commitment to ensure the continuity of operations.

How do you plan to contribute to Government’s Atmanirbhar Bharat Abhiyan? Indian Government has recently revised the MSME policy, as an international player how do you plan to leverage this opportunity?

We have always been immensely conscious about our contributions in the local market wherever we operate and in India we have always reiterated our commitment to support the industrial and technological development of the Country. We have a strong focus on fostering local employees by enabling them proper training and global expertise therefore creating local communities with sustainable development. Having said that in my earlier response, that we have developed our Mumbai office as the main Engineering Center of Excellence for the entire Group which means we have not only contributed towards Government’s

Atmanirbhar Bharat Abhiyan but went ahead where we export India’s engineering talent to our various projects operating worldwide. Hereby, we stand committed towards Government’s Atmanirbhar Bharat Abhiyan in every way possible.

In a nutshell, we as an international player have a “glocal” approach: we are global, but we can very effectively act locally, promoting interactions and synergies with local suppliers, and transferring know-how to ensure the growth of the entrepreneurial and industrial local network. By applying this model to our 20 most representative projects worldwide, for 2019 the total value of locally purchased goods and services, labour and training was approximately 5 billion euros, corresponding to 52% of project costs. The new MSME policy looks promising and as an international player to stand to get good benefit from this revised policy which would positively affect our top line as well as bottom line. ■

Digitalization of Systems for Condition Monitoring

Digitalization is the use of digital technologies to improve business processes and provide value-producing opportunities, it is the process of moving to a digital business. Digitalization drives integration of data, software, hardware, disciplines, value chains, industries, business models and people. This helps in the collaboration of various software applications, analytics, operations and maintenance activities. Condition monitoring (CM) is the process of monitoring the parameters of the condition of a system in order to identify a significant change which is indicative of a developing fault. Condition monitoring has the unique benefit of allowing a fault to be addressed before it develops into a major failure. In this article we are exploring digitalization of condition monitoring and how this transformation improves efficiency and optimizes industrial production by reducing downtime.

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Today, maintenance systems have developed, and industries have changed their views on how maintenance of the production facilities should be carried out to manage faults. Earlier, reactive maintenance was the norm and maintenance activities were carried out when equipment broke down. This

resulted in unplanned downtime and production loss which could prove costly to an organization.

As technology advanced, industries moved towards preventive maintenance, which is periodically performed on equipment irrespective of its condition. It is performed while the equipment is still working and helps to avoid breakdown to a certain

extent. However, this could also be seen as causing unnecessary maintenance.

Predictive maintenance techniques are engineered to determine the condition of running equipment and estimate when maintenance is required for that equipment. This is referred to as condition-based maintenance or condition monitoring. As the name suggests, condition monitoring (CM) is the process of monitoring the parameters of the condition of a system in order to identify a significant change which is indicative of a developing fault. The increase in computing power of electronics and decreasing costs enables the analysis of the enormous volume of data collected by sensors to provide meaningful reports for condition monitoring. This technique reduces maintenance costs and captures performance and health data to drive maintenance and inspection strategies. In connection to Industry 4.0, the predictive maintenance systems and approach are becoming more popular and enabling a change in the maintenance mind-set. The benefits are now seen in so many ways and most importantly, condition monitoring increases safety by preventing failures before they occur.

Digitalization of Condition Monitoring

Digital transformation is the process of updating legacy workflows to more efficient digital workflows. From a technical perspective, to digitalize is to incorporate artificial intelligence into the use of equipment data and process it for making maintenance and production decisions. This requires online systems, use of automation software, industrial communications, servers, algorithms and personnel training. SCADA, Safety Systems, DCS, IIoT generate data and all this captured production data is referred to as Big Data.

What generally happens is that all this information is stored in a traditional database and analyzed later if anything breaks. However, this reactive way of maintenance does not help prevent the actual breakdown. Digitalization of condition monitoring is about turning this data into actionable insight, which automates the maintenance process through monitoring of user-defined roles, processes and algorithms. This initiates the necessary maintenance activities, drives the work processes and does the work execution.



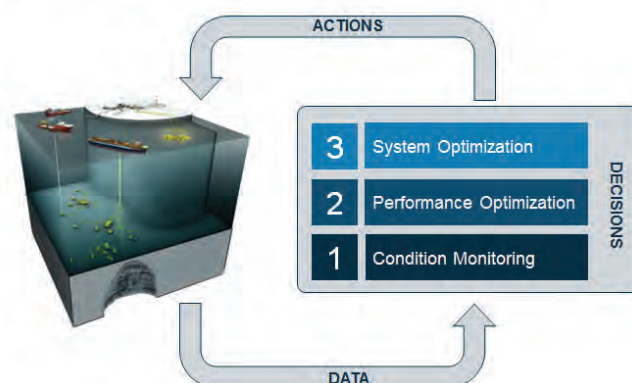
The main stages of CM digitalization are:

1. Gathering measurements from various industrial plant sensors/instrumentation readings such as vibration analysis, pressure, temperature, flow, current, power, voltage, device diagnostics, fluid analysis, closed loop tuning, operational/run hours, etc.
2. Storing the collected data in a control system database like OSIsoft PI, Honeywell PHD, AspenTech IP21, etc.
3. Write a query that collects condition monitoring data from relevant assets, define condition management algorithms, simple and complex expressions, statistical control, asset condition, multivariable logic, etc.
4. Define actions such as automatic generation of work order, work request, activity records, notification of operator and maintenance technicians through emails, text messaging, integration with maintenance management system like SAP, ERP, etc.
5. Keep track of generated actions completed within the schedule.

CM in Subsea Production Systems

Subsea production system (SPS) installations are going deeper, at more remote locations, in even colder

CM in a larger picture – making better decisions



environments and being exposed to demanding production fluids. The complexity of SPS is also increasing due to the realization of subsea processing and compression.

The operating environments of subsea installations are some of the toughest, making maintenance difficult. Reactive maintenance is costly as considerable spare-holding is required. Mobilizing technicians and equipment on short notice also leads to higher costs and longer timescales. Changing equipment on the seabed is a challenge and requires caution.

Preventive maintenance and other practices followed by topside facilities are not feasible for subsea installations. The deep-sea location and harsh environmental conditions on the seabed make preventive maintenance of subsea equipment difficult. Monitoring and maintenance activities often involve

special purpose-built ships or remotely operated vehicles (ROVs).

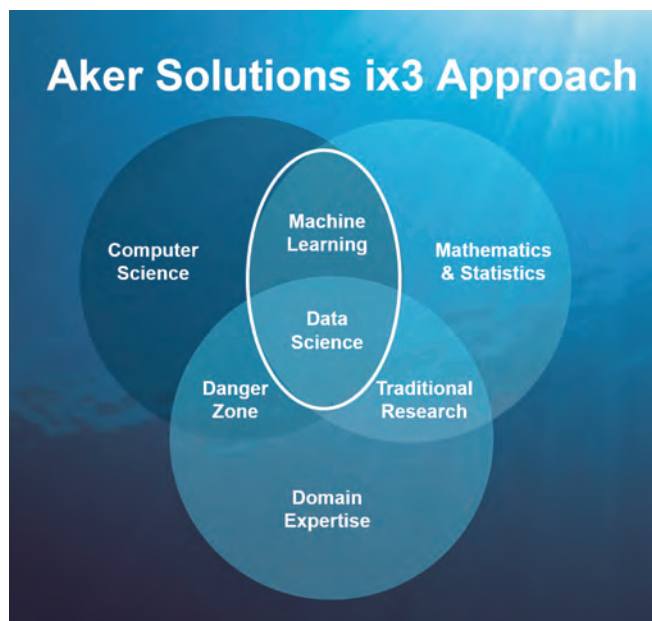
Subsea systems are designed to work for many years. However, over the period systems will degrade and some of the equipment may fail. In an effort to improve SPS safety and performance, many subsea installations have adopted condition-based maintenance approaches in their maintenance strategies.

As an example, Aker Solutions' ix3 Performance Elements analytics have been created using data science and some focused machine learning where appropriate.

The diagram shows the approach of applying traditional areas of expertise (computer science, mathematics and domain expertise) and how the overlap of those three creates data science and machine learning capabilities for condition monitoring.

Benefits of Digitalizing Condition Monitoring

- Early warning of potential failure: When measured parameters are well chosen and properly measured and analyzed, this gives warning of potential failure well in advance. This information can be used to generate maintenance work orders



automatically and collaborate with the maintenance department.

- Fast response: Due to digitalization, fast actions are achievable by giving email/SMS notifications thus improving overall efficiency of the organization.
- Efficient collaboration: Digitalization improves internal communications between the various departments.
- Cloud-based access: Maintenance workflows, maintenance records can be easily accessed through the cloud or using any device with internet access.
- Allows automated management of failure: Identification of a potential failure does not necessarily mean that immediate maintenance action is needed. This allows the automation of impending maintenance actions.
- Evaluates corrective action:

Immediately after a system has been repaired, it should be subject to condition monitoring testing. This will potentially identify assembly or installation faults that may lead to early failure.

- Use for performance optimization: An important result of CM is the understanding of bottlenecks or backlogs within the current production stream which can assist in the optimization of the assets involved.
- Efficient resource planning: Reviewing current and upcoming maintenance work orders can help achieve efficient resource planning.
- Reliability analysis: Organizing facilities and equipment-related maintenance data into a hierarchy can help in conducting reliability analysis of that facility.
- Gives information about the nature of the failure: If there is failure in the system, the root cause analysis will be easy. The rate of sampling and access to maintenance history on the machine may have an influence on the quality of the final decisions made.
- Enhanced IT security: Condition monitoring reports, maintenance records and workflows can be set up with security permissions so that only certain sets of personnel have access to it.
- Product performance insight:

Monitoring the performance and failure modes of products creates a much better understanding of the causes of failure. This information can be used to improve product design and improve product reliability.

Conclusion

Digitalization enables new ways of working on collected data, data processing and analysis that need to be addressed. This digitalization completes the entire maintenance cycle starting with collecting, monitoring, analyzing, sensor related data and digital linking to trigger work orders to execute the work. This transformation improves efficiency and optimizes industrial production. ■



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Healthy Pipeline of Projects over Next 5 Years

*It is envisaged that natural gas will be in the ambit of GST in coming years and which is expected to boost demand from industries due to the benefit of an input tax credit. Therefore, GAIL is taking up with the Government to keep natural gas under the ambit of GST to push gas usage in the country. If we consider 15% share of gas in the primary energy basket, then consumption has to be increased by almost 3x to reach around 500 MMSCMD by 2030 from current approx. 150 MMSCMD with a CAGR of 12%. **E S Ranganathan, Director Marketing, GAIL India Ltd.** shares insights into organization's growth strategy & key projects exclusively with Chemical Engineering World.*

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E S Ranganathan
Director Marketing
GAIL India Ltd.

How is GAIL India Ltd. moving forward to translate the vision of Indian Government to increase the share of natural gas in the energy basket from 6% to 15%? As a country, where do we stand at present in terms of gas consumption and by when are we likely to achieve this target?

GAIL is contributing in every aspect of gas value chain be it gas trading, gas transmission, city gas distribution, gas marketing, LNG market development etc. to realize Government of India's vision of increasing share of natural gas in energy basket from 6% to 15%. GAIL is laying a number of Natural Gas Pipelines in order to achieve the PNA India National Gas Grid (NGG). For achieving this target, GAIL is laying section i.e. Jagdishpur - Haldia - Bokaro - Dhamra Pipeline, Vijaipur Auraiya Pipeline, Barauni Guwahati Pipeline as part of Govt's Urja Ganga Project, Kochi - Kootanad - Bengaluru - Mangalore Pipeline Phase-II, North East Gas Grid (through Joint Venture company Indradhanush Gas Grid Limited with IOCL, ONGC, OIL, NRL). This will connect gas supply and demand centers across the country, and thereby making natural gas accessible to all the corners of country.

The future demand of gas in India will be primarily coming from CGD and industries. With growing awareness of urban pollution and ban on polluting fuels

like petcoke and furnace oil, we can see gradual adoption of gas in industries. Currently, GAIL is executing 20 City Gas Distribution GAs (Geographical Areas) out of which 6 have been authorized to GAIL along the Jagdishpur- Haldia -Bokaro- Dhamra pipeline, and 14 GAs are being executed by GAIL Gas. Further, GAIL is operating in 41 GAs through Joint Venture companies across India. In total GAIL is operating in 61 GAs in India to play a key role in CGD sector development. We have planned around Rs. 19,000 Cr investment in next 5 years to build CNG stations and provide PNG connections through GAIL's subsidiary and JV partners.

In order to further enhance gas usage in new segment like LNG trucking, GAIL is under discussion for development of LNG stations by CGD companies having authorized GAs along the important National Highways primarily Golden Quadrilateral Highway. GAIL is also in discussions with various stakeholders for developing Market Seeding Schemes for Fleet Operators for promoting use of LNG as Transport Fuel. GAIL is the largest LNG portfolio holder in India having diverse price linkages and shall be looking to offer value and reliable supply to consumers by selling right mix in domestic and international geographies. We are consistently looking to offer competitive

prices to Indian consumers across various sectors like fertilizers, industries, refineries etc.

Power sector is the key to any gas-based economy. If we take the example of the USA, over 35% of the electricity comes from gas, followed by 24% from coal. In the case of India, the situation is sharply contrasting, where over two-thirds of the electricity comes from coal-based plants and share of gas in electricity generation is merely 4%. Indian power sector needs reforms specially to promote usage of gas in power sector. GAIL is taking up various policy matters with the Government to provide favorable incentives for enhancing gas share in power generation.

The 'SATAT' (Sustainable Alternative Towards Affordable Transportation) scheme launched by the Ministry of Petroleum and Natural Gas to promote Compressed Bio Gas (CBG) as an alternative, green transport fuel is another new area which has long term potential to add to gas volumes in the country. Under SATAT, we have invited joint EOI through GAIL Gas and till date GAIL has issued 65 Letter of Intents for purchase of Compressed Bio-Gas.

It is envisaged that natural gas will be in the ambit of GST in coming years and which is expected to boost demand from

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industries due to the benefit of an input tax credit. Therefore, GAIL is taking up with the Government to keep natural gas under the ambit of GST to push gas usage in the country. If we consider 15% share of gas in the primary energy basket, then consumption has to be increased by almost 3x to reach around 500 MMSCMD by 2030 from current approx. 150 MMSCMD with a CAGR of 12%. It needs enormous efforts from all the stakeholders and policy reforms from the government to achieve this target.

How is the global market scenario changing in the gas industry and what are the plans of GAIL to drive the growth of this business in India and internationally? What are the challenges

and opportunities for GAIL and how do you plan to leverage these?

According to GIIGNL (International group of LNG importers) and IGU (International Gas Union) annual reports, the LNG market growth accelerated at a rate of 13% (approx. 41 MT) in 2019, with deliveries amounting to 354 MT as against 314 MT in 2018. Asia continued to be the leading importing region with a 69% share of global LNG imports. Year-on-year growth in Asian imports slowed from highs of 2017 and 2018, but Asia still remains a growth region. Market is witnessing downward pressure due to COVID-19 pandemic outbreak, which is likely to be continued in the immediate short term, thereby impacting spot LNG prices in a market with significant supply glut.

It is expected that the LNG demand in 2020 may now only reach up to about 360 MT as against pre-COVID projections of 377 MT. The silver lining being that despite COVID-19 outbreak, the LNG demand is still expected to increase. 2019 marked an all-time record increase in annual LNG production, driven by new liquefaction trains and ramp-ups in the United States, Russia and Australia. Over the last three years, the industry has added more than 80 MTPA of new capacity and significant volumes are due to come online by 2025.

Emerging markets are expected to drive the entire LNG demand growth till 2030. However, in the near term, the disruptive impact of the Covid-19 outbreak on the economies of importing countries will exert downward pressure on LNG demand in an already oversupplied market. Globally, it is expected that gas demand growth will be driven by China's policy push for gas use in power and industry as well as by competitive prices in producing regions. Additional demand growth will come mostly from new LNG buyers who will need flexible LNG contract size, duration, and pricing along with destination flexibility. In short term, there will be oversupply in global LNG market which may maintain downward pressure on LNG spot pricing with cash costs of US LNG and regional price convergence.

Europe absorbed the majority of 2019 supply growth as competitively- priced LNG furthered coal-to-gas switching in the power sector and replaced declining domestic gas production and pipeline gas imports. There was a modest rise in imports to Asia in 2019, compared to the previous two years, a result of mild weather and rising electricity generation from nuclear power in Japan and South Korea, two of the three largest global importers. In the short-term, supply growth is expected to slow down as the last of

Projects Worth around Rs. 1 lakh Crores Over the Next 5 Years

GAIL is planning to take up projects worth around Rs. 1 lakh Crores through self, subsidiaries and Joint Venture companies majorly in gas pipeline, city gas distribution and petrochemicals segment. In gas pipelines, GAIL is planning a CAPEX of around Rs. 38000 Crores to lay Jagdishpur - Haldia - Bokaro - Dhamra Pipeline, Vijaipur Auraiya Pipeline, Barauni Guwahati , Kochi - Kootanad - Bengaluru - Mangalore Pipeline Phase-II, along with other key limbs of the gas pipeline network across country.

In City Gas Distribution, GAIL is planning expenditure of around Rs. 18000 Cr. in cities authorized to GAIL, and GAIL Gas. As GAIL's Joint Venture companies have won a large number of GAs in the recent 9th and 10th round by PNGRB, GAIL will be making investment of around Rs. 23000 Crores in these companies to carry out CGD activities in existing and build CGD infrastructure in new cities.

GAIL is planning to set up a capital intensive 500 KTA Propane dehydrogenation and Polypropylene (PDH-PP) Plant at Usar, Maharashtra. This would be the first plant in India using Propane Dehydrogenation technology for production of Propylene. GAIL is planning to set up a coal gasification-based 2 MMTPA Urea project through a JV- Talcher Fertilizers Limited (TFL), formed with Coal India Limited (CIL), Rashtriya Chemicals and Fertilizers (RCF), each having 31.85% stake and Fertilizer Corporation of India Limited (FCIL) having 4.45% equity. This project has an estimated cost of around Rs. 13,000 Crore. Through above planned CAPEX and investments, we are playing a key role in development of the natural gas sector as well the petrochemical sector in India.

the new LNG projects under construction will be completed by 2021, restoring equilibrium. Longer-term demand is expected to double to 700 million tonnes by 2040 according to forecasts, spurring confidence in the role of gas in shaping a lower-carbon energy system.

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GAIL is largest LNG portfolio holder in India sourcing LNG from diverse geographies like U.S, Russia, Australia, Qatar etc. based on diverse price linkages. This enables us to offer high value and reliable supply to consumers in domestic and in international geographies as well. We are utilizing the high demand being experienced in Europe to place our LNG volumes. In India, as we are already working towards increasing share of natural gas from 6% to 15%, we are hopeful that LNG will find use in sectors like industries, CGD, fertilizers etc

How do you plan to go ahead with expansion of petrochemicals business? Tell us in detail about the planned investments, products and key markets intended to be served.

GAIL doubled the polymer production capacity from 410 Kilo Tons per annum (KTA) to 810 KTA at Pata complex a few years back. GAIL's subsidiary Brahmaputra Cracker & Polymer Limited (BCPL) has a capacity of 280 KTA taking total polymer marketing portfolio of GAIL to 1,090 KTA. Further, GAIL has a joint venture

with ONGC and GSPC i.e. ONGC Petro-Additions Limited (OPAL) which has a 1,400 KTA capacity plant at Dahej. GAIL has successfully maintained its market share in the domestic polyethylene market and remained the second largest player in the Indian petrochemical market with a portfolio of over 1,000 KTA of polyethylene. GAIL also exported 9 KTA of polymers to various Asian markets.

GAIL is in the process of setting up a 500 KTA Propane dehydrogenation and Polypropylene (PDH-PP) Plant at Usar, Maharashtra. This would be the first plant in India using Propane Dehydrogenation technology for production of Propylene. Further GAIL is going ahead with setting up a 60 KTA Polypropylene (PP) plant at Pata as well. GAIL is also looking to develop export capability and has been exploring new petrochemical market of other Asian countries.

India's per capita consumption of plastics at just 11 kg vs. the average global per capita consumption of 30 kg which presents tremendous growth opportunities not just for indigenous industry but also for the international players who see India as a high potential market. Therefore, in spite of global capacity additions, restrictions like ban on single use plastics, environment concerns etc. we are hopeful that the Indian petrochemical industry

is poised to remain lucrative in future for Indian players.

GAIL today is one of the most preferred petrochemicals players in India as our grades are of high quality which is valued rightly by the consignment stockists and consumers. We see a lot of competition coming from the Indian refiners and imports, but given the growth of petrochemicals market and high-quality grades of GAIL, we are hopeful that we will continue to remain one of the key players in industry. In 2019, GAIL became the first ever producer of Metallocene grade polymer in India. Apart from this, GAIL Pata petrochemical complex has also established sustained production of Hexene-1 based polymer grades in its New LLDPE Swing Unit, after which it has become the first plant of Univation technology, in India, having produced the slated Polymer grades using different catalysts in a single reactor. As far as our future plans are considered, the world scale PDHPP capacity of 500 KTA will give us competitive edge on cost and it will also provide us opportunity to diversify into other polypropylene derivatives like polyurethane, acrylics etc.

The perception or the negative sentiments developed against usage of plastics is because of the unorganized or improper disposal mechanism of plastics in

many countries especially developing economies. Therefore, proper disposal, waste handling and recycling will remain key to correct the sentiments against plastics usage. Many developed countries already have regulations in place on disposal and recycling of plastic waste, however, India doesn't have any strict regulations on the same. The Indian petrochemicals industry needs to work on this aspect of the plastic industry. GAIL is making efforts to develop plastic recycling technologies.

Under Swaccha Bharat Mission, Ministry of housing and urban affairs and also the Rural Ministry is working on waste plastic management for Urban / Rural Plastic waste management. Plastic is an inseparable part of development especially in the urban areas. As the use of plastic is bound to increase due to its inherent merits of economy, versatility, hygiene and moreover no better alternative, a good recycle reuse and waste management ecosystem will help mitigating the menace of spillage and reduce use of wood and metals which have a larger environment footprint in a long run. Government of India is also working on same lines to become truly a circular economy in use of plastic which many of the developed nations have already achieved.

On above lines to develop technologies in

plastic recycling, GAIL has set up a Pilot plant on the conversion of "Waste plastic to Diesel" of 1TPD capacity in the premises of the Indian Institute of Petroleum (IIP), Dehradun as an R&D project. Currently, trial operations are being carried out in the Pilot plant to generate data for validation of the technology for commercialization.

Tell us about the plan to foray into Specialty Chemicals and growth plan over the next few years. Which are the key target industries and countries for this business?

Indian chemicals industry has given higher growth to shareholders' return as compared to oil & gas, consumer products, pharmaceuticals and even higher than automobiles in last six years. Chemicals are a significant part of India's overall trade flow, consistently ranking third in imports and fourth in exports for the past five years. The global specialty chemical market is expected to grow at 4% with 70% of demand expected to come from Asia. Driven by fundamental consumption, growth in demand of specialty chemicals will be coming for sectors like plastic additives, flavors and fragrances, cosmetics, enzymes, cleaners, adhesives, agro chemicals etc.

Given the low per- capita polymer consumption, growth in end user

industries like packaging, personal care, construction, textiles etc., urge to reduce dependence on imports and favorable Govt incentives like setting up of PCPIRs, the Indian chemicals industry is seen as an attractive investment destination. Given these merits, GAIL is exploring opportunities in the sector and no firm investment decisions have been made in this regard by GAIL. However, we hope that we will be able to utilize the immense opportunity that specialty chemical industry of India demonstrates for the future.

What are the future plans and priority business initiatives for GAIL?

GAIL has undertaken 'Strategy 2030' exercise to define its journey through the next decade. The strategy has been developed with an objective of building a strong business portfolio and organization structure which is not only robust enough to respond to the fast-changing business scenario but also unlocks growth opportunities for long term growth of the Company and in turn delivers long term value to stakeholders. As mentioned before, GAIL is planning to bid consistently for new pipelines put on offer through PNGRB. GAIL shall continue to grow its gas transmission business by laying important sections of National Gas Grid (NGG) i.e. Jagdishpur -

Haldia - Bokaro - Dhamra Pipeline, Kochi - Kootanad - Bengaluru - Mangalore Pipeline Phase-II, Vijaipur Auraiya Pipeline, Barauni Guwahati Pipeline, North East Gas Grid (through Joint Venture company Indradhanush Gas Grid Limited with IOCL, ONGC, OIL, NRL) aligning with Government priorities and by providing last mile connectivity.

Development of Indian gas market is a major focus area of GAIL. To grow the gas market share, GAIL shall be pushing for higher gas usage in the industrial segment, transport segment using CNG & LNG, trigeneration etc., ensuring off take of envisaged additional domestic gas production and increasing pace of activities in the fast growing CGD sector through GAIL Gas and JVs. GAIL is under discussion for development of LNG stations by CGD companies having authorized Geographical Areas along the important National Highways primarily Golden Quadrilateral Highway. GAIL is also in discussions with various stakeholders for developing Market Seeding Schemes for Fleet Operators for promoting use of LNG as Transport Fuel.

GAIL shall be exploring opportunities in the petrochemicals segment to leverage upon our extensive presence and high future demand of polyethylene and polypropylene. We shall also be

assessing whether opportunities exist in certain specialty chemicals in India. GAIL will selectively make investment in the Renewable Energy domain given the future growth potential and also to partner with Govt. in meeting India's INDC (Intended Nationally Determined Contributions) commitments on climate change. GAIL is exploring the opportunity of acquiring stakes in renewable energy assets of existing players and also looking towards participating in solar park tenders as Solar Power Producer.

GAIL is continuously exploring new business opportunities which have the potential to offer future growth engine and substantially add to the portfolio. To promote new technologies, GAIL has invested in startups which focus on new technologies like Electric Vehicles, digitization etc. GAIL shall also be focusing on preparing next line of leadership and developing capabilities to realize the strategic direction that has been envisioned.

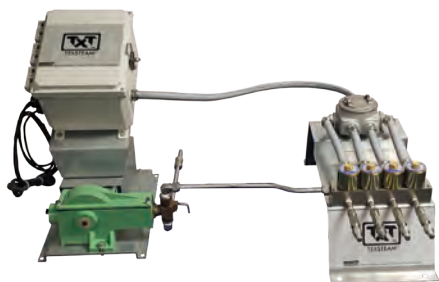
How does the gas major plan to give a major fillip to the 'Make in India' program?

The 500 KTA Propylene De-hydrogenation Polypropylene (PDHPP) Plant in Usar, Maharashtra and 60 KTA Polypropylene plant in Pata will help in reducing petrochemicals import in country. GAIL

is a leading participant in MoP&NG's Sustainable Alternative Towards Affordable Transportation (SATAT) scheme to promote Bio-CNG using domestic bio-mass and organic waste. This will supplement availability of domestic gas to be diverted to transportation sector. Thus, reducing dependence on imported fossil fuels.

GAIL through its JV Talcher Fertilizer Ltd. is setting up a 2 MMTPA gas-based fertilizer plant using coal gasification technology in Angul, Odisha. This will have twin benefit of reduction in import of fertilizer and enhanced production of domestic natural gas through coal gasification. GAIL through its Jagdishpur-Haldia-Bokaro-Dhamra Pipeline (JHBDPL) project is connecting and reviving the three fertilizer plants under revival mode at Gorakhpur, Barauni and Sindri and also the urea manufacturing unit at Durgapur, which shall help in enhancing fertilizer production, contributing towards reduction in fertilizer import bill. ■

Multipoint injection for pumps



Dresser Natural Gas Solutions (Dresser NGS), a leading provider of measurement, instrumentation and piping solutions to the natural gas distribution and transmissions markets, has launched a multipoint injection controller adjustment for its Texstream pumps, through its Industrial Products Group (IPG).

Texstream multipoint injection will be used in oil and gas wellhead chemical injection operations to distribute chemicals from a single chemical injection pump to multiple injection points. Texstream multipoint injection offers increased flexibility by enabling users to distribute different flow rates to various end points with one pump head and a simple controller. This lowers capital spend by reducing the amount of equipment required for chemical injection. Instead of needing four pumps for four different wellheads, the operator will now be able to inject four wellheads with just one pump.

The Texstream multipoint injection system works to a maximum operating pressure of 2500 psi with the solenoid assembly having only 10W power consumption. The electrical junction box is explosion-proof, dust-ignition proof, and raintight certified. The solenoid valves are Class I and II Groups C, D, E, F & G, Division 1 and 2. The multipoint system is used with the Class 1, Div 2 iCIP™ Solar package

For details contact:

Dresser Natural Gas Solutions
www.dresserngs.com

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Pneumatic & Electrical Operated Control Valves



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For details contact:

Dynamic Controls and Services
sales@dynamiccontrols.in / admin@dynamiccontrols.in

Anti-Corrosion and Anti-Abrasion resistant rubber linings



LeBracs Rubber Linings Private Limited is a leading industry in the field of Anti-Corrosion and Anti-Abrasion resistant rubber linings in India, located at Puducherry. LeBracs Rubber serves chemical process industries, like Caustic and Chlor Alkali Industries, Fertilizer Industries, Water Treatment and Desalination Plants, Mining and Mineral Processing Industries & Flue Gas Desulphurization Plants

For details contact:

LeBracs Rubber Linings Private Limited
info@lebracsrubber.com ; fgd@lebracsrubber.com ;
hose@lebracsrubber.com

Intelligent high-performance Roots pumps

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HiLobe Roots pumps are available in a broad spectrum of pumping speeds and applications. These are particularly suited for rapid evacuations (lock chambers or leak detection systems) and as well for general coating applications. Compact Roots pumps handle a wide range of nominal pumping speeds up to 6,200 m³/h. Thanks to their powerful drive concept, they achieve around 20 percent shorter pump-down times than conventional Roots pumps. Rapid evacuation also saves costs

and increases the efficiency of production systems. The HiLobe series boasts an over 50 percent reduction in maintenance and energy costs compared to conventional Roots pumps. The pumps are hermetically sealed from the atmosphere and have a maximum integral leak rate of $1 \cdot 10^{-6}$ Pa m³/s. Dynamic seals are eliminated, thus making maintenance only necessary every four years. Cost-intensive water cooling is not necessary since HiLobe Roots pumps can also be operated at ambient temperatures of up to +40 °C using flexible air cooling. The intelligent interface technology ensures optimal process adjustment and condition monitoring.

For details contact:

Pfeiffer Vacuum GmbH
www.pfeiffer-vacuum.com

Corrosion Preventive Coating



ITW Chemin launched the improved version of RUST-O-WAX, an aerosol coating for protection of critical metal components against corrosion damage. RUST-O-WAX is a long term outdoor and indoor corrosion protection from rust and corrosion, for machined surfaces and assemblies subjected to long periods of storage or adverse shipping condition. The waxy non-brittle film is highly resistant to humidity and severe corrosive atmosphere. The new formula of RUST-O-WAX improves its ability to withstand higher temperatures and can be applied directly onto hot surfaces. This translates into long lasting protection, uniform coverage with no sagging during application.

Its features make it suitable for use on moulds used in injection moulding manufacturing process. After prolonged use, the temperature of the mould rises and RUST-O-WAX can be directly applied onto these surfaces for protection prior to storage. In addition to this, RUST-O-WAX is also suitable for protection of finished metal and plastic components, in process parts, battery terminals, farm machinery & metal spare parts against corrosion.

RUST-O-WAX is available in both natural and blue color version aerosol cans of 400 ml capacity.

For details contact:

ITW Chemin
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GAIL (India) Ltd



GAIL (India) Limited



AIL (India) Ltd. is a Central Public Sector Undertaking (PSU) under the Ministry of Petroleum and Natural Gas, with the mission of accelerating and optimizing the effective and economic use of Natural Gas and its fractions for the benefit of the national economy.

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GAIL, having started as a Gas Transmission Company during the late eighties, has grown organically by building a large network of Natural Gas pipelines covering over 12,200 km; two LPG Pipelines covering more than 2,000 km; six Gas Processing plants for production of LPG and other liquid hydrocarbons, with a combined production capacity of around 1.3 MMTPA. GAIL has a Petrochemical plant in North India with a capacity 810000 TPA, North-east India with a capacity of 2,80,000 TPA and western India with capacity of 140000 TPA. The company has integrated upstream into the business of Exploration & Production with participating interests in 11 E&P Blocks, including 2 blocks in Myanmar. GAIL has also integrated downstream into the high growth retail City Gas Distribution business both in India and abroad. GAIL is today an integrated energy company in the

hydrocarbon sector with focus on gas and beyond.

GAIL has overseas presence in five countries. The Company has a wholly owned subsidiary, GAIL Global (USA) Inc. (GGUI) in USA, which has formed a JV with Carrizo Oil & Gas Inc. to acquire stake in its Eagle Ford Shale acreage. Further, the company has booked 2.3 MMTPA capacity in Dominion Cove Point LNG liquefaction project and also signed a Gas Sale and Purchase Agreement (GSPA) with WGL Midstream Inc. for procurement of corresponding volume of Natural Gas.

GAIL has another wholly-owned subsidiary company viz. GAIL Global (Singapore) Pte. Ltd. based in Singapore for trading in LNG & Petrochemicals and for undertaking overseas investments. GAIL has around 4.2% equity partnership in South East Asia Gas Pipeline Company (SEAGP) which is transporting gas from Myanmar to China from these blocks. GAIL has made investments in two companies in downstream business in Egypt and one in China.

GAIL has executed a long-term LNG Sale and Purchase Agreement with Sabine

Pass Liquefaction LLC for purchase of 3.5 Million Tons per Annum (MMTPA) of LNG from Sabine Pass Liquefaction terminal project, USA and also signed a long-term agreement with Gazprom Marketing and Trading Singapore for supply of 2.5 MMTPA of LNG from Russia.

GAIL has also signed a GSPA to source 38 MMSCMD of natural gas through transnational pipeline from Turkmenistan. GAIL is now an equity partner of TAPI Pipeline Company Ltd. (TPCL) which has been formed for the transnational pipeline project from Turkmenistan.

With an aim to ensure cleaner and quality energy in Eastern India at an affordable Price, Government of India (GoI) aggressively promoted the execution of 2655 Km Jagdishpur – Haldia & Bokaro – Dhamra Natural Gas Pipeline Project (JHBDPL), popularly known as the **Urja Ganga of Eastern India**. JHBDPL is being taken up at an investment of Rs. 12940 crore and is scheduled to be completed from 2018 – 2020 in Phases. **JHBDPL caters the energy requirements of five states, namely Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal**, covering 49 Districts and 2270 Villages. This is being further extended from Barauni to Guwahati by laying additional 727 km pipeline.

About GAIL's Hawa Badlo Initiative

GAIL has been playing a vital role to build a mass movement for accelerated energy transition towards a cleaner mix. With the primary aim to sensitize people on the

harmful effects of air pollution, GAIL has initiated the **Hawa Badlo (Change the Air) campaign**, an independent people's movement, the first of its kind in India. During its awareness journey, it also came to light that while people are aware of the harmful effects of polluting fuels, they are ignorant of solutions to address the problem. The campaign further adapted to build awareness of the energy alternatives available and galvanize them into adopting natural gas for a cleaner and sustainable lifestyle.

To ensure maximum reach, Hawa Badlo was digitally launched with exciting posts, teasers and videos featuring people from all walks of life, from Indian cinema celebrities to people at large, including school and college students. Short videos and clips of different durations were carefully planned for multiple platforms and consumer touch points such as digital and radio. This was followed by on-ground consumer engagement activities such as tie-ups with resident welfare associations, school associations, and tree plantation drives.

The campaign has digitally touched more than 100 million lives enabling people to make a direct link between their energy consumption patterns and the impact on their health and environment, and motivating them to voluntarily switch to the more economic and environmentally friendly 'natural gas'. The campaign helped in building the narrative towards cleaner air through a gas-based economy. ■

Future of Digital Capital Project Management - 5D Capital Projects



It goes without saying that effective monitoring of Capital Projects is an essential part, especially when we see that majority of these projects are getting delayed. Within capital projects, the cost of construction is close to half of the total investment and with every day delay we incur more losses. According to recent studies industry is expected to incur a loss of over trillion dollars due to delays and other related issues. Now the question to be asked is what is causing the delay?

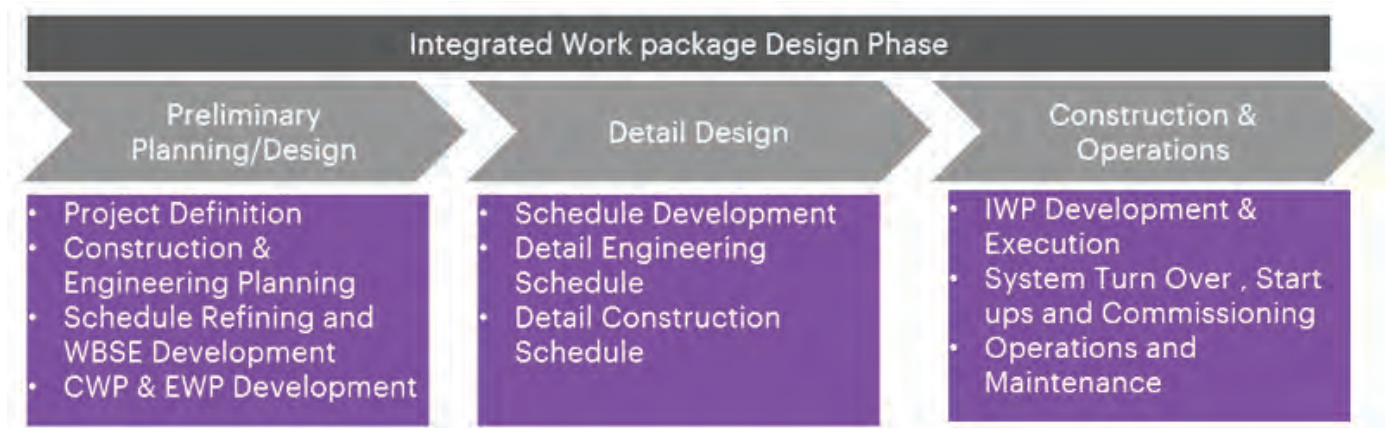
A typical capital project involves multiple contractors working across different locations, and operators often leverage multiple interfaces with different contractors across the engineering, procurement and construction phases of the project. This means that Operators have to form an integrated project schedule using individual contractor schedule, ensure alignment between engineering work package design and construction work package design in alignment with the master schedule which becomes very challenging. It is therefore necessary to produce a connected system across these engineering, procurement and construction areas across contractors

to give an end-to-end picture of the entire project progress on a single platform. This will help visualize the progress, conflicts, dependencies on different contractors involved in the process and impacts on cost. So how do we do this?

Operator companies can leverage Advanced Work Package (AWP) methodology which brings in all these dimensions under one platform. This methodology integrates the engineering Work Breakdown Structure (WBS) to schedule, procurement (Cost & Material) and construction to implement AWP, which in turn defines the Integrated Work Package (IWP). This adds to five dimensions i.e. engineering (3D), time (1D) and materials (1D) under one platform – hence 5D capital project

AWP shifts the focus to the early planning stages and provides a holistic process for work-packaging execution with a project lifecycle orientation starting from preliminary planning descending to detail design and construction.

Preliminary Planning – Engineering Procurement Construction Management (EPCM) team starts by identifying the critical activities and proper sequence.



The sequence of the activities is defined in work packages as deliverables. The project is initially broken down into the Construction Work Packages (CWP). The CWP is nothing but a logical and executable segregation of work which is delivered as work scope of construction. Engineering Work packages (EWP) which are the work packages aligned with Engineering deliverables, is then logically related to CWP. This forms the base of project execution.

Detail Design - In this phase, EPCM defines the CWP association to the specifications of the EWP, including detail specifications such as systems, area and equipment package associated to CWP. This helps project execution schedule to be broken down to level 3 schedule.

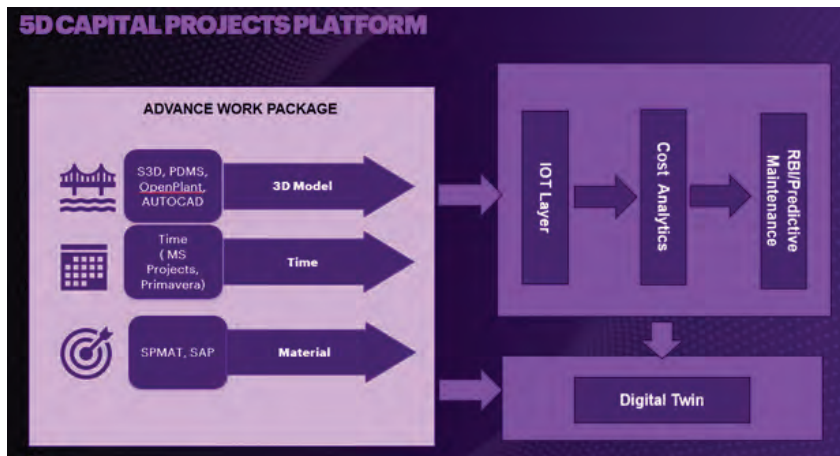
Construction & Operation – During this phase, the detail planning is done by associating the material work package with engineering and construction generating Inspection Work Package (IWP). The IWP completely tracks the

progress of construction till the installation of process. IWP which are derived are based on collective input obtained from engineering; procurement (from contractors, suppliers, fabricators and other service providers); and construction. The duration of IWP typically ranges from two to four months. Also developing of IWP takes place in batches for different phases of the project.

Brining it together in the construction phase:

EPCM issues the IWP around three weeks in advance. It is approved by frontline contractor personnel such as department leads. The operator validates the IWP release and provides feedback, which can considerably reduce rework and help in compacting the schedules. This goes on a regular basis as AWP demands progressive handover of IWP.

At Accenture, we have implemented this approach across our customer base. We have built platform which seamlessly



brings the five dimensions together as explained above.

Our platform does not stop here. We have added an analytical layer over AWP methodology. This helps us to integrate cost which gives rise to cost-based analysis together with schedule tracking, thus reducing the cost during construction.

We have further extended this platform to bring down OPEX. We are providing IOT layer over constructed assets, which ensures any changes on the assets during construction is tracked through our 5D Capital Projects platform. Post the completion of the construction, the 5D Capital Projects Platform can be transformed to a Digital Twin of the plant which helps in risk-based inspection and preventive maintenance. Further, this helps in ensuring process & people safety and brings down the OPEX as well.

To conclude, while it is difficult to bring all the stakeholders on the same platform in

a huge capital project, AWP methodology has made it easier to release IWP in a short duration of time. Developing AWP still revolves around the coordination of different stakeholders, but leveraging the right technology plays a key role in defining the success of AWP. There are lot of technological platforms existing in the market, their

adaptability should depend on the ecosystem of the operator. Finally, it is the AWP approach which precedes over the technology used that drives on schedule and on budget delivery of capital projects. ■

Authors



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A Breath of Fresh Air




Founded in 1997, the Asia Pacific Petrochemical Co., Ltd., which is headquartered in Bangkok, Thailand, has rapidly grown into one of the leading importers, exporters and distributors of hydrocarbons, oxygenated solvents and monomers for use in industrial-manufacturing operations in the Asia-Pacific region. Helping Asia Pacific Petrochemical reach its lofty status has been a group of subsidiary companies that are strategically located in an area that includes the Southeast Asian island nations of Indonesia, Singapore, the Philippines and Malaysia.

Representing the group in Indonesia is PT. Indochemical Citra Kimia, widely known as "IndoChem." Based in Jakarta, Indonesia, IndoChem was founded in 1982 and is a recognized leader in solvent production for use in the Indonesian paint and coatings market, and also a

significant producer of glues and inks for various industrial applications. IndoChem's solvent-manufacturing business consists of three plants located in Indonesia. These plants have holding tanks that can accommodate up to 45,000 liters (11,888 gallons), and are constantly being filled and emptied depending on the facility's manufacturing and delivery needs. In all, IndoChem produces and handles a total of 300 million liters (79.3 million gallons)

Quick Facts

Company :

PT. Indochemical Citra Kimia

Location : Jakarta , Indonesia

Market : Solvent Manufacturing

Distributor :

Wisnton Engineering Indonesia , Jakarta, Indonesia

Challenge : IndoChem needed to optimise the loading times energy efficiency & product containment of its solvent handling pumps

Solution :

Pro Flo R SHIFT AODD Pumps deliver enhanced loading times with leak free operation & optimized air consumption

of solvents per year at its three production facilities.

Growing Pains



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Over its 30 plus years of operation PT. Indochemicals Citra Kimia better known as IndoChem has grown into a recognized leader in solvent glue and ink production for use in a number of industrial markets in South East Asia

As IndoChem's customer base has increased, several operational challenges have begun to hamper its ability to reliably and efficiently meet its production quotas:

- The time needed to fill one 45,000-liter holding tank has approached seven hours, which is unacceptable for IndoChem's clients
- The capacity of IndoChem's air-compressor unit has been maxed out and it is not possible to add another compressor from both an economic and available-space Standpoint
- Perhaps most importantly, the

solvents produced by IndoChem are highly flammable, and some of them selfspark, so it is important from a safety standpoint that they are contained adequately

"Our current transfer time is approximately three hours for transferring input and three hours for transferring output, plus 30 minutes for mixing and 30 minutes for preparation," said Erwin Juardi, General Manager of Operations for IndoChem. "Since we're planning on some improvements, we wanted to add more pumps, but we want to stay with the same aircompressor capacity. I'd love to

Optimizing Air Consumption in AODD Pumps

Throughout its history, air-operated double-diaphragm (AODD) pump manufacturers have been working to find a reliable solution to the technology's one blind spot: the "overfilling" of the air chamber during the period from the end of each stroke to the completed shift of the valve without any corresponding displacement of fluid, which is nothing more than wasted air that is vented to the atmosphere. To combat this overfilling, Wilden® Pump & Engineering Co., Grand Terrace, CA, USA, has long been an innovator in air distribution and while its Turbo-Flo™, Pro-Flo™ and Pro-Flo SHIFT™

ADS models undeniably advanced the capabilities of the technology, the industry was still waiting for that ultimate "Eureka!" moment in ADS development. That moment arrived in 2013 when Wilden completed the development of the Pro-Flo® SHIFT ADS. Described as a "true game-changer" and "significant breakthrough in energy efficiency" in AODD-pump operation, the mechanically actuated Pro-Flo SHIFT ADS restricts air flow into the air chamber near the end of each pump stroke through the incorporation of an air control spool that automatically meters the air to prevent overfilling with no corresponding reduction in product yield.

This means that an AODD pump outfitted with the Pro-Flo SHIFT ADS—which is available on Wilden's Original™ (clamped) and Advanced™ (bolted) Series AODD Pumps—can achieve up to 60% savings in air consumption while costing 50% less to operate than pumps that feature an electronically actuated ADS. An additional benefit is that the Pro-Flo SHIFT is mechanically actuated, which is a critical consideration when the pump is handling hazardous or flammable liquids. Electronically actuated ADSs, on the other hand, cannot be used with flammable or explosive liquids since the electric charge can cause sparking which could ignite the liquid and result in a deadly explosion. "Having this Pro-Flo SHIFT pump means I can save air and won't need to add compressors, which means less electricity use, and that I can also increase my productivity," said Edwin Juardi, General Manager of IndoChem.

see whether it's possible that I can save air even though I'm adding pumps and getting more pumping capacity."

To facilitate the transfer of solvents, Juardi utilizes a total of 60 pumps between his three manufacturing facilities. He had been strictly relying on a single brand of

AODD pump, but over time he had come to find the pumps unreliable and costly to operate. "They have a high cost of replacement parts, and I have a hard time getting diaphragms; I'm fed up with these pumps," he said flatly. "The diaphragms don't hold up and it's hard to work on them. It takes two guys to simply change



As on site head -to head test at Indochem facility unequivocally illustrated that a Wilden Bolted Series AODD Pump outfitted with the Pro Flo SHIFT ADS shortened loading times while cutting air consumption (competitor pump shown)

a diaphragm and I don't want manpower wasted on pump maintenance. We needed a simpler, more reliable, higher-performing alternative."

In the search for a better solution, Juardi turned to Winston Engineering Indonesia, Jakarta, Indonesia. Since 2005, Winston Engineering Jakarta, which is an operating company within Singapore-based Winston Engineering Company (PTE) Ltd., has been a pump distributor specializing in pump technology designed for use in general industrial-pumping applications, including the handling of solvents, glues and inks.

Seeing Is Believing

Juardi worked with Peter Koh, Regional Product Manager for Winston Engineering, who was quick to suggest the new Pro-Flo® SHIFT AODD Pump from Wilden®, Grand Terrace, CA, USA. Company founder Jim Wilden invented AODD pump technology in 1955. The Pro-Flo SHIFT is an AODD pump air distribution system (ADS) that can deliver as much as 60% savings in air consumption when compared to other brands.

"Winston Engineering has a long relationship with Wilden and PSG, and we have been selling their products for more than 20 years," said Koh. "With the latest Pro-Flo SHIFT technology it is bringing Wilden to the next level. This pump really, really has an edge when it comes to energy savings." But rather than simply have Juardi take his word for it, Koh arranged to have an on-site test and demonstration of the Pro-Flo SHIFT technology done at one of IndoChem's facilities. The test involved three separate trials in which both a Wilden Pro-Flo SHIFT pump—specifically, a 51-mm (2-inch) PS800 Bolted Series a competitive model would pump 200 liters (52.8 gallons) of water, with all pumping done at a pressure of 4 bar (58 psi). Measured would be the time it took to pump the water along with the amount of air that would be required to complete the pumping process.

Extrapolating the results for one of IndoChem's standard 45,000-liter tanks, the test results showed that the Wilden pump would be able to fill the larger tank



Installing the revolutionary Pro Flo SHIFT ADS on a Wilden Bolted Series AODD Pump gave IndoChem the flow rates, air consumption & product containment capabilities that it requires in its solvent handling operations

in 78 minutes less than the competitive model, while needing 2,164.08 fewer standard cubic feet per minute (SCFM) to complete the transfer process.

Juardi was easily convinced. "I know that Wilden pumps are very reliable," said Juardi.

"We've had one here for more than 20 years and we haven't found any problems with it. So, I'm thinking, let's change the old pumps to Wilden. What we're learning from the old Wilden pump is that it has been here forever, but with no problems. I was also looking for air savings because I cannot afford to buy any more air compressors."

In addition to the air-consumption improvements that the Pro-Flo SHIFT ADS can provide to the Advanced Series AODD Pumps, there are a number of operational

benefits that IndoChem will be able to take advantage of. The bolted configuration of the pumps ensures total product containment, a key consideration with the hazardous materials that IndoChem creates and handles. Additionally, the Advanced pumps have a redesigned friction-reducing liquid path that contributes greatly to their ability to deliver maximized flow rates. In fact, the PS800 (51 mm) pump can achieve flow rates as high as 704 L/min (186 gpm), while the larger PS1500 (76 mm) model has flows to 1,045 L/min (276 gpm).

A variety of elastomer options, including



Erwin Juardi, General Manager of Operations for IndoChem is convinced he has found the solution to his solvent handling needs with the Wilden Pro Flo® SHIFT AODD Pump



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Knowing that Wilden Pro Flo® SHIFT AODD Pump will fill a 45,000 liter tank in 78 less minutes while consuming 2,164 fewer standard cubic feet per minute of compressed air than a competitive model has put a collective smile on the faces of IndoChem engineering team (L- to R: Rob Cheng & Peter Koh of Winston Engineering)

PTFE, Wil-Flex® (Santoprene) and Neoprene, are available to meet abrasion, temperature and chemical compatibility concerns. Wilden's newest diaphragm option is the innovative Chem-Fuse Integral Piston Diaphragm (IPD). The design of the Chem-Fuse locates the piston within the diaphragm material, which eliminates a notorious leak point and further helps to guarantee leak-free product containment.

Conclusion

Too often, the easy suggestion when a manufacturing facility has reached the limits of its operational capacity is this one: Find a bigger facility. In the case of IndoChem, though, that was not a feasible solution. So, that meant the solvent manufacturer needed to find a way to optimize its productivity in terms of time, air consumption and energy usage while operating from the same footprint. IndoChem found the answer in the new Bolted Series Pro- Flo SHIFT AODD Pump from Wilden, which will enable it to simultaneously improve both its fluid-transfer times and energy savings while working out of the same facility with the same air compressor.

"The unique features of Wilden pumps are very easy for maintenance, portable and with a very unique high-efficiency ADS, which is the heart of the pump," said Koh. "Every part is replaceable, even for pumps that have been in the factory for more than 10 years. That's part of why customers stay with the Wilden brand. Wilden is the unique market leader in diaphragm pumps." ■

For more information

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service.psgindia@psgdover.com

Website: www.psgdover.com

Greene Tweed's Chemraz® Sealing Solutions Increase Reliability and Pump Lifetimes in EO/PO Service



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A major problem facing the world's leading chemical companies is how to increase their MTBF (mean time between failure) of their screw spindle pumps from several weeks to several years, while improving safety at all pump installations.

For example, a rotary pump might be used as a reactor pump to carry EO/PO (ethylene oxide, propylene oxide), which is a very reactive, dangerous medium. EO/PO end users generally will not change o-ring specifications without thorough proof of chemical compatibility.

Perfluoroelastomers, also known

as FFKMs, are elastomeric sealing materials with broad chemical compatibility and high temperature resistance. Selecting an FFKM optimized for EO/PO applications could reduce the possibility of equipment failure.

The Challenge

After repeated failures of multiple FFKMs, a leading EO/PO chemical company located in Eastern Germany was looking for an FFKM that would increase their MTBF from several weeks to several years, while improving safety at all pump installations.

Their previously installed perfluoroelastomers swelled and lacked

sealing force, resulting in unplanned maintenance every few weeks, which was unacceptable.

The chemical company contacted Greene Tweed, who offered an ideal solution to extend MTBF – by installing seals manufactured from Chemraz® 505, one of few materials recommended for service in corrosive EO media.

Greene Tweed

Greene Tweed, a leading global manufacturer of high-performance materials and products, leverages extensive engineering, design, and manufacturing expertise to provide solutions that provide exceptional performance in the challenging environments of the chemical processing market.

After careful evaluation of the application and its operating parameters, Greene Tweed proposed Chemraz® 505 o-rings as a solution. Chemraz® 505, a perfluoroelastomer, provides a broad range of chemical resistance, and is used in o-rings, gaskets, and many other custom shapes. Because of its versatility, Chemraz® 505 is often used as a standard compound and can be found in a variety of applications, including acids, caustics, aldehydes, esters, ethers, aromatics, hot water, steam, amines, methanol, ketones, TBA, and MTBE.

With a temperature range

of -22°F to 446°F (-30°C to 230°C), Chemraz® 505 is ideal for processes in subzero temperatures and for use in multi-substance plants or in mixed media due to its broad chemical resistance. Its lower compression set provides better ability to handle such temperature and pressure variations, along with shaft misalignment, and o-ring shrinkage.

The Results (Sidebar)

After receiving the recommendation to install Chemraz® 505 o-rings in their pumps, the East German chemical company:

- Successfully trialed Chemraz® 505 in an R&D pilot EO service plant in the same location.
- Retrofitted four screw spindle pumps with Chemraz® 505 for a total of 16 mechanical seals.
- Specified Chemraz 505 for all screw spindle pumps throughout the plant.

Technical Data	
Pump type	Rotary pumps W6
	(screw spindle pumps)
Mechanical seal	Multi-spring type seal; sealing liquid: glycol
Media	EO/PO
Temperature	248°F (120°C)
Pressure	116 psi (max. 8 bar)
Former product	Four different competitor elastomers were used
New product	Chemraz® 505



Chemraz® 505 successfully replaced all four of the previously used competitor elastomers.

The Benefits

- Improved reliability/MTBF — Chemraz® 505 o-rings have increased pump lifetime from several weeks to almost four years. The pump continues to run without problems. Scheduled maintenance is set for every five years, and it appears this goal will be met without a challenge.
- Excellent chemical resistance in aggressive media and chemical attack — Chemraz 505® reduces the risk of seal swell in EO/PO service, thus decreasing the possibility of equipment failure due to leakage.

Chemraz® Chemical Processing Solutions

For more than 30 years, Greene Tweed has been pushing the limits of materials science developing high-performance solutions for the chemical processing industry. Greene Tweed's Chemraz® perfluoroelastomers lead the way for critical sealing applications, with proven reliability in harsh environmental conditions.

The ultimate elastomeric material, Chemraz® FFKM is engineered from fluorinated monomers, including tetrafluoroethylene and perfluorovinylether, and a cure site monomer for crosslinking. Chemraz® offers the broadest chemical resistance of any elastomeric material, combining the resilience and sealing force of an elastomer with chemical resistance approaching that of PTFE while withstanding a wide range of temperatures (-40°F to 615°F, -40°C to 324°C). Its distinctive chemical composition makes it well suited for a range of applications. Because of its low compression set, outstanding physical properties, and universal chemical resistance, Chemraz® reliably reduces the risk of unplanned downtime due to equipment failure. ■

For more information

<https://www.gtweed.com/wp-content/uploads/2020/03/chemraz-505-ed-pb.pdf>

GACL - Writing Success with Salt



Aerial view of GACL Caustic Soda Complex, Vadodara, Gujarat



ujarat Alkalies and Chemicals Limited (GACL) was established in the year 1973 in Vadodara, Gujarat to manufacture Caustic Soda and allied products. Promoted by the Government of Gujarat, by harping on cutting edge technology, groundbreaking research and development and through strategic diversification, GACL

has emerged as one of the largest manufacturers of caustic soda with around 12% share in domestic Chlor-Alkali sector. From an initial capacity of 37,425 TPA caustic soda, the organization has enhanced its capacity to 4,12,500 TPA and the facilities are spread over 2 complexes at Vadodara and Dahej. From its two facilities, GACL now offers 36 products.



Hydrogen Peroxide Plant, Dahej Complex

With a strong dealer network, in-house research and Development facilities, proximity to major raw material sources and markets GACL is scaling new peaks of glory. By balancing the interest of mother nature, society, employees, customers, stakeholders and shareholders, the organisation is making its growth more meaningful.

The Organisation has co-promoted Gujarat industries power company Ltd., Enviro Channel Ltd., Gujarat Chemical Port Terminal Company Ltd., Gujarat Guardian Ltd., GACL-NALCO Alkalies & Chemicals Pvt. Ltd. etc. along with other corporations

to ensure the industrial growth in Gujarat.

With more than 5,000 customers including some of the finest global corporations, GACL has established itself strongly in the markets of North America, Europe, Africa, Asia Pacific, MENA (the Middle East and North Africa) and other regions. The organization is playing a significant role in enriching Gujarat and empowering the progressive strides of the nation.

In its more than 45 years of journey, GACL has become a competitive and global corporation. It offers products having agricultural and industrial applications thus becoming an integral part of



Panoramic view of GACL Dahej Complex, Dist. Bharuch, Gujarat

people's daily life. The synergistic product development techniques and processes with the global best corporations have further helped GACL consolidate its place as a leading chemical corporation. GACL is constantly diversifying its offering and adding new products and expanding its existing capacities:

- 800 TPD Caustic Soda Project integrated with a 130 MW coal-based power plant in JV with NALCO
- 1,05,000 TPA Chloromethanes Project
- 33,870 TPA Phosphoric Acid Project
- 10,000 TPA Hydrazine Hydrate Project
- 39,600 TPA Chlorotoluenes Project



Chloromethane Plant, Vadodara Complex

- Expansion of existing Dahej Caustic Soda Plant from 785 TPD to 1310 TPD

- 65 MW Coal based Power Plant

To fuel its growth further, GACL is working on establishing new projects and expanding its capacity.



The Organisation has planned to expand its operation in the next 3-4 years by establishing.

Beyond its dynamic product basket, GACL has distinguished itself with the Green Initiative. It was the pioneer in the caustic soda industry to replace the Mercury Cell Technology with the environment-friendly membrane cell technology way back in 1989. GACL is also the first state promoted enterprise to adopt renewable wind energy to fuel its progress. The Organisation has a current total installed Wind Power capacity of 171.45 MW and 35 MW Solar Power Project for its captive use. With this, the aggregate renewable energy capacity reached to 206.45 MW, which caters more than 25% of energy requirements.

Keeping an eye on the future, the organization is also considering the manufacturing of various Chlorine-based products so that the production of Caustic Soda can be optimized while consolidating and maintaining

its prime position in Chlor-Alkali and other integrated downstream products. Going beyond, the organization is also exploring the possibilities for setting up plants for producing new value-added products having their applications in pharmaceuticals, cosmetics, personal care products, detergent, epoxy resins etc and many such fields.

The GACL Product Basket:

Caustic Soda Lye, Caustic Soda Flakes, Caustic Soda Prills, Hydrochloric Acid, Liquid Chlorine, Compressed Hydrogen Gas, Sodium Hypochlorite, Methyl Chloride, Methylene Chloride, Chloroform, Carbon Tetrachloride, Hydrogen Peroxide, Phosphoric Acid, Caustic Potash Lye, Caustic Potash Flakes, Potassium Carbonate, Sodium Chlorate, Anhydrous Aluminium Chloride, Poly Aluminium Chloride (Virgin Grade), Stable Bleaching Powder, Chlorinated Paraffin, Benzyl Chloride, Benzyl Alcohol, Benzaldehyde, Scalewin, Biowin, Bleachwin, Anhydrous Sodium Sulphate. ■

Exotic Material Heat Exchangers



HRS Process Systems Ltd, is part of the UK based HRS group, an established name in the field of innovative heat transfer solution. HRS Group is globally known for providing energy efficient range of heat exchangers and heat exchanger based systems. HRS PSL is fully equipped with state-of-the-art manufacturing facility near Pune, Maharashtra with mechanical and thermal design expertise to manufacture heat exchanger in exotic materials. Exotic material heat exchangers are widely used in pharmaceutical, chemical, agrochemical, petrochemical, water desalination, oil & gas, steel, power, ORS processing, food and beverages and other allied industries. Exotic material heat exchangers are generally used to avoid corrosion and gives better life to processes. It is not only use for liquid application but also used for gas condensations in specific processes. The biggest advantage using heat exchangers in exotic materials is their compatibility with high temperatures and pressure applications.

HRS PSL has technical proficiency to understand and provide product and services as per the standard norms. Another reason to believe is HRS's corrugated tube technology that sets HRS apart from competition in the market and makes preferred choice of decision makers for the process industries. Because of corrugated tube technology heat exchangers that made with exotic materials becomes compact and energy efficient which is beneficial for buyer in terms of price and transportation. HRS has proficiency to design and manufacture heat exchangers in materials like all grades of stainless steel, Titanium, Tantalum, Duplex, Super Duplex, Alloy 20, Copper, Cu-Ni Alloys, Inconel, Monel, SMO, C22, C276, C2000, AL6XN and other special material required for critical heat transfer processes. ■

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Italvacuum and India: Can't stop the feeling!



Italvacuum, with over 80 years of experience in the design and production of vacuum pumps and vacuum dryers for pharmaceutical and chemical companies, is a well-known company in Italy and Europe, but it also confirms its position as an important player in this sector on a global level. The presence of the company in the five continents, with a number of installations in continuous growth in both consolidated and emerging markets, is a tangible sign of Italvacuum's reliability. India, in particular, is one of the main markets for Italvacuum and for many years, some of the most important Indian pharmaceutical and chemical groups have relied on the Turin-based company for the drying of their products. Let's discover together why, thanks also to the precious contribution of Italvacuum Sales Area Manager Mr. Ennio Batissa.

The keys to Italvacuum's success in India

Present on the Indian market since the 1990s, Italvacuum, an Italian vacuum pump and vacuum dryer manufacturer, has steadily increased its market share and sales volumes in India year after year and is still growing. What are the main reasons

that have led to this excellent collaboration over the years? Ennio Batissa, Italvacuum Sales Area Manager in India has told us some secrets...

"The success of Italvacuum in India," says Batissa, "has not been accidental, but is the result of a constant commitment over time and the creation of business relationships built in a stable and lasting way". "If I had to summarize in few points the reason for the success of Italvacuum in India" continues the Area Manager, "I would use these four keywords:

- **Reliability;** Italvacuum machines offer very long lasting levels of performance, precisely because of the high quality of the machinery. This is certainly an aspect that has been rewarded over the years by Indian companies, more inclined to purchase quality machinery and very demanding from the point of view of maintaining an high level of performance;
- **Service;** as far as Service is concerned, we mean the whole part of commissioning and maintenance operations. On this point, a decisive role is played by Vacuum Drying Technology India LLP, sole indian

agent for Italvacuum since 2005. Over the years, Italvacuum has guaranteed the training of the Indian company's technicians, in all phases of service, from the moment of installation of the machinery to the moment of both ordinary and extraordinary maintenance, thus guaranteeing complete and efficient on-site assistance to the customer.



Fig 1 : Saurus939

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- **Well-rooted presence;** the collaboration with Vacuum Drying Technology India LLP, is not only fundamental as far as the provision of services is concerned, but it has allowed Italvacuum a well-rooted and widespread presence throughout the Indian territory.
- **References;** last but not least, the number of strong and consolidated commercial relationships with the most important Indian Pharmaceutical and Chemical groups, of which Italvacuum is very proud"

Most appreciated products - Vacuum Pump Saurus 939

Designed to never stop - Vacuum pumps must above all work reliability for 24 hours a day and 7 days a week. However, due

to the growing competitive pressure, the operators require economic operation and complete clarity of the final product. Specialists from Italy meet the challenge.

Be it vacuum drying, reaction procedure, distillation, crystallisation, filtration, vaporization or even polymerization - all these processes require vacuum.

Italvacuum has perfected, potentised and overhauled the vacuum pump Saurus939 over the years precisely for these processes in order to guarantee an optimum operation in all important chemical and pharmaceutical processes such as drying, distillation, reaction and crystallization processes.

For this, the vacuum pump should ensure the complete recovery of extracted solvent, even in particularly difficult operating conditions with durably constant throughput and high degree of vacuum.

In this way, the vacuum pump Saurus 939

can vacuum the steams of conventional solvents (methanol, ethyl alcohol, chloroform, acetone, acetic ether, methyl chloride, benzene, toluene, isopropyl alcohol, diethyl ether, heptane) as well as that of aggressive solvents (hydrochloric acid, acetic acid, chlorobenzene, dimethyl, acrylonitrile, dichloroethane, cyclohexane, pyridine, dimethyl sulfoxide).

Robust and Reliable - In order to guarantee this, the pump is developed and designed for continuous operation. The Italians also have an eye on the operating costs: Due to the energy-saving engines, the negligible oil consumption and simple, economic maintenance, the costs remain very low.

Cylinders, pistons, piston rings and cylinder head consist of "acid-free" special cast-iron. The other parts are produced from machine casting, special purpose steel and PTFE with filler material. The pump is completely closed and compact and hence suitable to render optimal performances over a long time period even in humid, dust-laden rooms. The exhaust valves have an opening in the direction of flow and are available in various materials, including hastelloy.

Moreover, the pump is air-cooled. Saurus 939 has two completely separate and independent lubrication cycles: one for the process section with calibrated injection of fresh oil using the Lubri Zero system and one for the mechanics with oil circulation. The Lubri Zero system — mounted on the

two-stage models— facilitates negligible oil consumption. It combines a calibrated oil injection with a kit made of new PTEE materials with special filler materials that are resistant to corrosion and practically do not require any lubrication. Thus, "FDA approved" synthetic oils can also be used. The equilibrated injection of few drops of fresh oil (ratio 10 g/h) guarantees an effective protection even against the aggressive solvents with the result that the operating performance of perfect cylinder-piston clearance and thus the service life of vacuum pump are increased considerably.

Uncontaminated vacuum - Besides a high-performance, durable and efficient operation, users particularly demand absolute safety in the pharmaceutical and fine-chemical production: With the vacuum pump, Italvacuum offers a device that facilitates maximum safety of entire process and complete clarity of the final product. In other words, an uncontaminated vacuum. Therefore, not a single oil molecule can reach the treated product during the entire operation cycle. This is also certified by the faculty for material science and chemical engineering at the Politecnico Institute of technology in Turin with a specific study that was carried out on the entire vacuum drying process.

Quality should not be considered as expenditure, but as investment. And an investment is measured on the basis of concrete results—and not just in terms of operating performance and operating



Fig. 2 : Production Plant in Borgaro T.se (Italy)

duration. Low operating costs and production quality also pay at last.

144 Today Italvacuum's production capacities include a wide range of original and patented products, in addition to vacuum pumps:

- Horizontal paddle vacuum dryers
- Rotary double cone vacuum dryers / powderers
- Tray vacuum dryers
- Laboratory-scale tray vacuum ovens
- Rotary cylindrical vacuum systems.

The right partner for Indian market of yesterday, today and tomorrow

Although the Covid-19 health emergency has upset the world economy and despite the situation is still to be considered at least unstable and fluid, what is significant for Italvacuum lies in the continuation of relations and economic exchanges with

India, which have not only maintained their solidity but have continued to grow even in this difficult period. During the Lockdown period in Italy, Italvacuum has always guaranteed service to its customers and also as far as India is concerned, thanks also to our sole agent, sales and after-sales service has always been guaranteed without renouncing the classic quality.

This allows us to look with extreme confidence towards the future and we are confident that this economic relationship that binds us can further improve and grow. ■

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Automated Karl Fischer Titration

- Keeps Transformers Humming



A

As global infrastructure expands and power reaches

ever more corners of the world, METTLER TOLEDO's InMotion™ Oven Autosampler for Karl Fischer titration helps maximize the lifespan of costly electrical transformers.

High-voltage electrical transformers are insulated and cooled by circulating oils. Traditionally based on mineral oils such as paraffin, these insulating oils consist of a variety of formulations selected for compatibility with the type and location (e.g. the ambient temperature range experienced) of the transformer in which they are utilized. Any imperfections during production of the transformer's internal windings or core, combined with weathering over time, will gradually degrade its efficiency and lifespan. Careful quality control of the insulating oils, which may be used for 25 years or



more, is therefore crucial to ensuring consistent and safe transformer operation.

Insulating oils extracted periodically from transformers are characterized by standard test methods issued by ASTM, IEC and others. The testing occurs in specialized labs that deal not only with high inbound sample loads, but also with oil conditions ranging from new, clean and clear to golden yellow, contaminated and ready for refurbishment.

Among other key chemical parameters for testing, trace water amounts of only 30–35 parts per million—either absorbed from the atmosphere or occurring as a byproduct of internal degradation—significantly decrease the dielectric breakdown voltage and thus the transformer's life. This necessitates their careful monitoring; oil samples must test at or below 30 ppm water to reduce the likelihood of disruptive, or even catastrophic, events such as corona discharge or arcing

Accurate water determination

Coulometric Karl Fischer (KF) titration is a robust technique for measuring trace water in transformer oils in accordance with methods such as ASTM D1533, "Standard Test Method for Water in Insulating Liquids". METTLER TOLEDO's C30S Compact Titrator repeatably quantifies water amounts under 10 ppm. The simple One Click™ interface allows the same test for all oil samples with the push of a button.

Automation solutions

For high sample loads, an InMotion KF Oven Autosampler analyzes up to 26 pre-loaded samples, allowing operators to multi-task across the lab. The system automatically and reliably extracts and quantifies the last traces of water thanks to a unique heated transfer tube

between oven and titration cell. When networked with the LabX® laboratory software, multiple titrators can be connected, operated and monitored centrally, including seamless connection to LIMS and other data management systems.

About METTLER TOLEDO

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

For more information

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Email-sales.mtin@mt.com

“Long way to go before Indian users fully appreciate quality with appropriate cost”



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Prasad Jawaji, Managing Director, PROTEGO India says, capital cost cuts in procurement of Flame Arresters and Breather Valves by opting for non-tested and non-certified devices do not provide the ring of protection they are being procured for, but become a cause of continuous drain of maintenance money in terms of loss of products, withering of product quality, secondary damages, fire hazards, spare part consumption and overall physical damage threat to the application.

Prasad Jawaji

Managing Director
PROTEGO India



What is the current market size of explosion protection technologies globally & in India?

The current Indian market for Flame Arresters for explosion protection is approximately INR 600 Million and globally (around 300 Million Euros).

Please share insights into the Indian operations and the role in global growth strategy. What are the key differentiators of Indian vis-à-vis other international markets in terms of customer experience?

148 PROTEGO is an engineering and R&D company with state of art manufacturing facility. Our range of expertise is not just limited to explosion protection but also environment and tank safety. PROTEGO India is an ATEX certified manufacturing hub adhering to all the German quality requirements. The Indian unit is the largest PROTEGO manufacturing unit outside Germany and manufactures almost 80% of devices made in Germany. This unit also caters to other PROTEGO companies situated across globe.

Quality and Certified Safety product with well-established testing standards is respected globally and the key for evaluation of correct solution. Global leading companies handling volatile and expensive liquids and gases, place huge

preference to long term performance of such devices whereas many Indian companies work on a very tight capital budget for such safety devices.

Tell us about the patented Flame arrester technology of PROTEGO. How has this technology evolved over the years & what are the features of next generation product?

PROTEGO was the patent holder for Hydrogen Flame Arresters. PROTEGO has the world's largest privately owned Flame Arrester explosion testing facility in Germany. This is backed up with the world's largest privately owned flow test facility. Both the facilities together are a must to test and certify a Flame Arrester for its flame arresting quality as per ISO 16852 (IS 16485) and test the Flame Arrester for designed flow v/s pressure drop. PROTEGO also has the unique Endurance Flame Arresters and one of its kind special Flame Arrester for Styrene and other critical industry applications. PROTEGO R&D is continuously working for new developments with the latest being a Flame Arrester with Plastic flame arresting element. Easy handling design of filter elements is another innovation which helps in ease of maintenance especially for bigger size flame filter elements.

Which are the other innovations that you have to offer in India?

PROTEGO India has been approved to manufacture Floating Suction Units and Roof Drains for Fixed and Floating Roof Tanks. This brings German technology into India which is dominated by Imported options. We also have an IPR agreement with M/s Lighting Master Protection to manufacture and cater the Indian market for its brand of Bypass Conductors, MAGS, as per NFPA 780 and OISD GDN 180. Today PROTEGO has over 2500 units installations across India, which is highest in any country across continents. We are also working on economic options of various types of devices to cater the mid specification market.

Though the oil & gas and chemical industry is hazardous by nature, still which are the most explosion prone areas that are sometimes overlooked by the industry?

Storage Tanks are the biggest risk in an Oil & Gas and Chemical Industry. An incorreced selected / manufactured / tested Flame Arrester or Breather Valve or both in combinations expose the tanks to not just tank explosion due to fire but also risk of tank exploding and imploding due to insufficient capabilities of venting and pressure drops across the devices.

Flame Arresters when put in combination with Breather Valves require a very detailed understanding of working of both the devices in unison. A wrong or improper

selection is a recipe for disaster. Very few customers pay attention to the tank loading pipes coming from the tankers. This can be major risk if neglected. Capital cost cuts in procurement of Flame Arresters and Breather Valves by opting for non-tested and non-certified devices does not provide the ring of protection they are being procured for , but also become a cause of continuous drain of maintenance money in terms of loss of products , withering of product quality, secondary damages, Fire Hazard, spare part consumption and overall physical damage threat to the application which was designated to be kept safe in the first place,

What is the competition in the domain of explosion prevention products in India especially in the market with presence of many medium & small-scale manufacturers who offer products at much lower prices? How do you stay competitive?

The Indian manufacturing scene is filled with players who have very limited to scares respect for quality and ethics of compliance to international standards. The lack or limited awareness of Indian customers about Flame Arresters and Breather Valves, added with limited testing facilities at CMRI are misused by many local manufacturers with false confirmations to quality and test standards

and requirement. Our endeavor is always to continuously educate the customers about the benefits of using a quality product when it comes to Plant Safety and Conservation of vapors. Continuous indigenization and working with our local and global supply chain, we have been able to rationalize the cost to cater to quality conscious customers across India.

Can you share any incident where the customer came back to buy the product after making a bad decision just on the basis of compromising on the cost.

To share one of the many experiences on how correct selection could have saved millions in rupees and many lives, I would like to share an unfortunate accident at a well-known aromatic manufacturing unit in the Konkan belt. Our engineers and Channel Partners prior to the accident had been visiting the plant and advising the users of the improper installations of Flame Arresters on top of tanks with volatile liquids. The Flame Arresters records showed that neither were they a test certified device nor was the physical condition intact. Low standard materials used had corroded whatever was there in the name of safety. An unfortunate accident caused all these tanks to explode with immense fire and losses. Now when they reconstruct the Plant and Tanks, they understand that a lot could have been saved with attention to safety. PROTEGO

is now their standardized brand for Flame Arresters. Long way to go before Indian users fully appreciate quality with appropriate cost.

How has the pandemic affected the business and how have you handled this crisis?

The lockdown has affected new business growth in the new markets and segments we wish to explore and expand. The time was well utilized by conducting more than 50 product training webinars. With new projects and existing project of traditional market going slow or on hold is a challenge, which we are trying to circumvent with business from new applications in the existing market base.

Tell us about the future plans of the organization?

PROTEGO India plans to enhance its engineering services and become a source of engineering to our global sister companies in addition to the support we offer with our manufacturing hub. This will add to the German engineering strength and help PROTEGO grow globally as a market leader in Safety and Environment. ■

Wave Spring Technology :

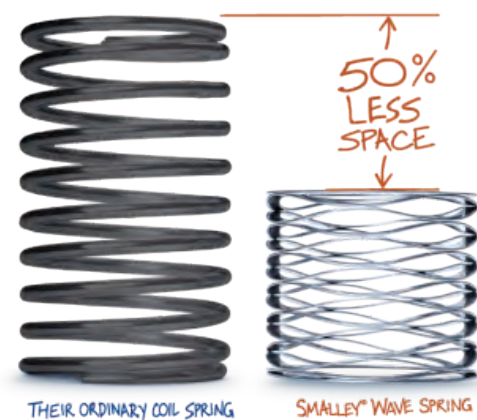
Merits & Values



Smart tool for Design Engineers to create Compact, Light weight, Cost effective products & solutions.

One of the key aspects of advanced design thinking is to design and manufacture products considering reduction in size, weight, raw material usage, while providing similar or improved performance, quality and reliability. Wave Spring Technology is proven concept to meet these targets and offers many merits.

- **Merit 1: DESIGN:** Smalley's Crest-to-Crest® Wave Springs provides the same spring force and deflection with 50% of the height compared to conventional coil springs. This enables the industry to design and manufacture more compact, light-weight assemblies with lesser raw material.
- **Merit 2: MANUFACTURING PROCESS:** Single-Turn Wave Springs, often used for taking of tolerances or applying a preload are manufactured utilizing Smalley's unique edgewinding process. Coiled, not stamped like traditional wave



springs provides a spring that has circular grain structure. Coiled Wave springs provide more accurate, repeatable load when compared to wave washers made of conventional stamping process, made out of sheets. The stamped wave spring, experiences fatigue, prior to the end of the life of the assembly thus leading to poor performance.

Engines, Gearboxes, Transmissions, Brake systems, Clutch systems, Connectors, Switches, Motors, Steering systems, Actuators, Valves, Pumps and Mechanical seals are some of the potential applications of Wave Springs to provide a consistent linear spring



Pic. 2: Bearing without a preload : Clearance between components can cause vibration & wear

force and ensure greater sealability, safety and minimizing maintenance down time.

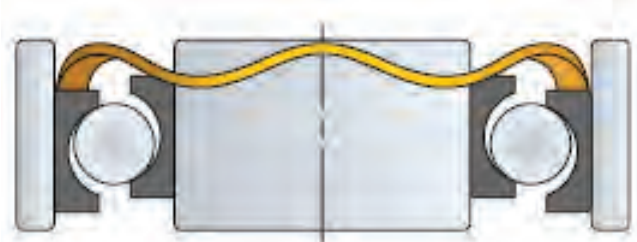
Bearing Pre-load

What is bearing pre-load?

Ball bearings, composed of multiple parts working together as an assembly, are designed with clearances that permit freedom of motion. Clearance is not necessarily a result of manufacturing. Precision – bearings may be designed with greater clearance to accommodate higher axial loads or minor axial misalignment. As clearance and manufacturing tolerances stack up, a bearing assembly will begin to experience axial and radial play.

Bearing Preload is the process of adding a sustained axial load, independent of external loads, to the bearing. An axial preload ensures constant contact between the ball complement and bearing races reducing or eliminating both modes of play.

Spring Preload, a versatile execution



Pic. 2: Bearing without a preload : The ball complement & bearing races mate reliably reducing or eliminating vibration & wear

of Bearing Preload, utilizes single turn Wave Springs to add the necessary preload forces despite dimensional variation and thermal expansion. Properly preloading a bearing can increase its life and eliminate the vibration and noise that results from specified clearance, manufacturing precision, and wear.

Merits & Benefits of bearing pre-load:

- Enhance smooth running of bearing.
- Reduce Friction & Wear.
- Reduce Noise, Vibration & Harshness
- Helps energy conservation
- Reduce maintenance down time.
- Reduce maintenance costs.
- Improve plant equipment productivity & Reliability.
- Improve manufacturing accuracy. ■

For more information

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Website : www.smalley.com , www.smalley.co.in,
www.mark-seals.com

Water Electrolysis – An Alternative Way to Treat Cooling Tower Circulation Water to Reduce Blow Down Water Consumption



Water electrolysis is a known principle and many applications in water treatment & waste water treatment utilize this principle. Each application poses its own challenges. Field trials and actual implementation on the commercial scale have proven that water electrolysis can be a promising alternative to treat cooling tower circulation water effectively and reduce the blow down water consumption.

The Principle:

Water electrolysis system is a chemical free treatment system to treat water for the cooling towers. Such systems are typically installed in the side stream of cooling tower so that it works effectively because of the higher conductivity levels. The main circulation water flow is not disturbed.

The system would consist of Electrolytic Reactor comprising of Anode and Cathode - anode is an electrode with special

material that would cause the reaction of high pH at cathode.

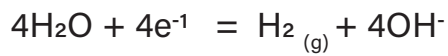
The water circulation pump would circulate the water from cooling tower sump to the electrolysis chamber or reactor where electrolysis takes place. Because of the DC current passing through reactor, water would be ionized to create OH⁻ ions, which creates high pH at cathode. Because the pH at cathode is high, water would have tendency to precipitate temporary calcium & magnesium hardness on the cathode walls.

At anode, Chlorine gas along with mixed oxidants are generated which will control the microbial and algae growth. The typical reactions that occur in the electrolytic reactor are:

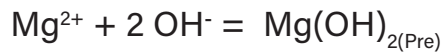
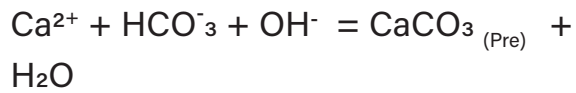
- Primary Anode Reaction
(Oxidation of Water)
 $2\text{H}_2\text{O} - 4\text{e}^- = \text{O}_2 + 4\text{H}^+$
- Primary Cathode Reaction

IMPACT FEATURE

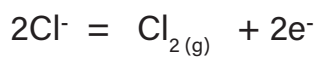
(Reduction of Water)



- Secondary Cathode Reactions



- Secondary Anode reactions

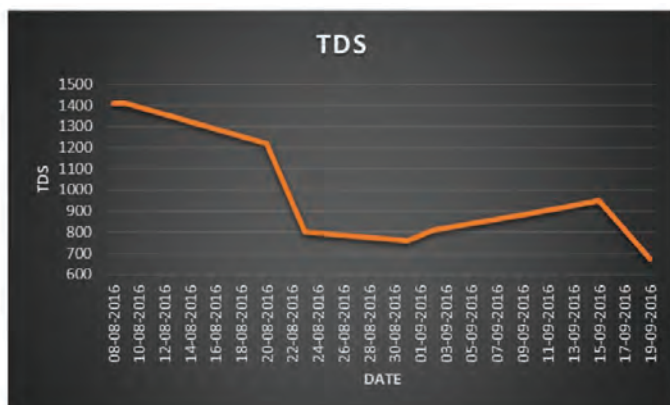


As the temporary hardness reduces, scaling in heat exchanger pipes, cooling

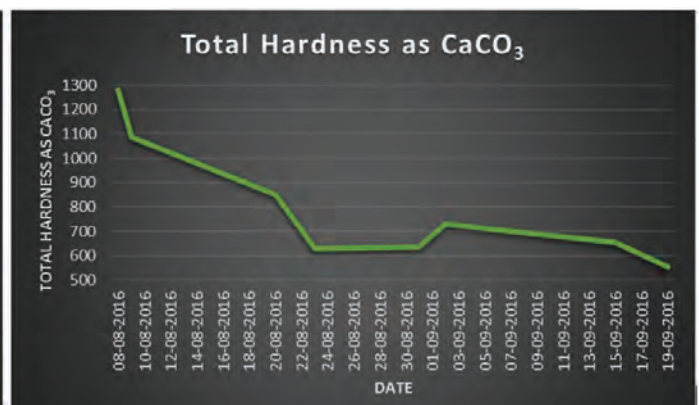
water pipes and the entire cooling circuit is reduced to a great extent.

Corrosion in the cooling water circuit is also reduced because water pH is maintained in circulation water is towards less aggressive. Chemical dosing in the cooling towers is eliminated or reduced drastically. Because the temporary hardness is removed, circulation water can be at a higher TDS. This would result into reduction of up to 60% blowdown water consumption.

The Case Study:



Reduction in TDS



Reduction in Total Hardness



Removed Scale collected in the reactor



Loose scale easily scrapped off from reactor

The Case Study

Benefits:

- Saving in chemical dosing cost in cooling towers
- Up to 60% reduction in blowdown water consumption
- Saving in ETP treatment cost
- Substantial saving in energy cost in case of ZLD plants
- Reduction in cooling tower fills cleaning & replacement frequency

A Case Study of a Pharma Company that Saves Water & Energy with ECOMax-CT®

Pharma companies need Cooling Towers for water cooled chillers for their operations. These Cooling towers must continuously replenish their chemically treated cooling water by frequent blowing. This is expensive, water intensive and environmentally sensitive.

One of India's largest multinational generic pharma company with headquarters in Mumbai, installed a 1500 TR Cooling Tower for cooling needs in their research center in Pune. They faced problems of high-water consumption, chemical usage and high energy consumption in their ZLD plant where blowdown water is sent. The challenge was to reduce blowdown water consumption, eliminate chemical dosing and save energy in ZLD plant.

ECOMax-CT® Electrolytic Cooling Tower Water Treatment System was installed to reduce blow down water consumption.

The ECOMAX impact

- Resulting measured blow down water saving was 80%
- Sump water TDS was maintained below 1500 ppm
- Total hardness in sump was maintained below 100 ppm
- pH was maintained around 8.0
- Resulted in over 4500 kL of water saving per year
- Chemical dosing in cooling tower is totally stopped
- Resulted into substantial steam savings in ZLD plant with lesser cooling tower blowdown
- Pay back on the investment was around 11 months ■



Author

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Ecomax Solutions Pvt Ltd

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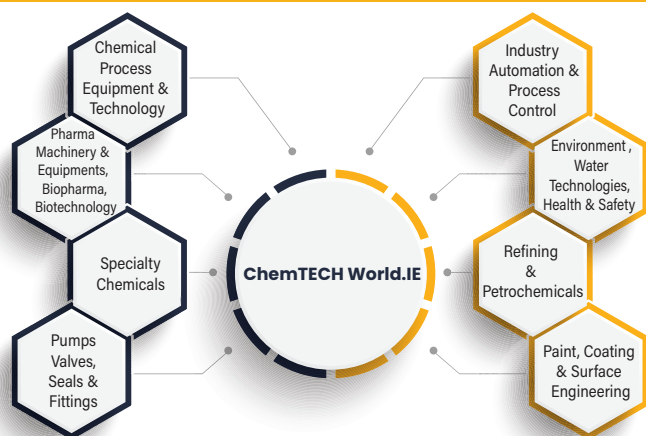
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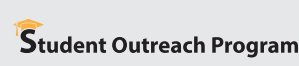
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