SULPHATE REMOVAL AND CONCENTRATION SYSTEM (SRCS)

SepraTECH Solutions’ Sulphate Removal and Concentration System (SRCS) is a membrane-based skid mounted plug & play system which has benefitted the chlor-alkali industry for purifying depleted brine or pure brine from sulphate impurities. With decades of experience in process applications, we are dedicated to provide sound engineering solutions to clients while minimizing overall project costs and surpassing extreme quality expectations as a manufacturer and supplier of SRCS for purifying both depleted brine (NaCl - 210 ± 20 g/l) and pure brine (NaCl - 310 ± 10 g/l) from sulphate ions.

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- Environmental benefits by reducing effluent discharge and eliminating barium sulfate solid waste disposal
- Improved electrolyser power consumption if barium is no longer used
- Easy integration with existing facilities with minimal downtime and automated PLC/SCADA operation

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For further enquiries, please email our APAC Business Development Manager
vikram.pandit@sandvik.com
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2. (a) Extension of Foreign Trade Policy 2015-2020 - 31/03/2022
   (b) Extension of Handbook of Procedures 2015-2020 - 31/03/2022
3. ABS, EDC, VCM & PC QCO Amendment Order, 2022 - 11/03/2022
4. Model contract for use of Biomass in Thermal Power Plants (TPPs) - 03/03/2022

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Dear Reader,

AMAI Members led by AMAI President, Mr. Kapil Malhotra had an introductory meeting with Smt. Arti Ahuja, IAS, the new Secretary, DCPC, this month. The presentation given to the Secretary included an overview of the industry and some major issues that impeded the industry’s growth. Appreciating the industry concerns, the Secretary sought detailed submissions and assured to take up the various issues with relevant departments/ ministries for early resolution. The issues highlighted during the meeting related to environment clearances, power costs and international trade.

India’s growth trajectory is expected to remain steady in 2022-23 supported by measures taken by the government. GDP growth is expected to touch 9% during 2022-23. However, worrying factors are geopolitics, inflationary pressures and new corona variants that threaten to disrupt the growth path. For the chemicals sector, two important support measures the industry did not get despite high expectations were the RoDTEP and PLI Schemes. RoDTEP, which replaced MEIS could have supported to achieve higher exports. A robust PLI scheme can accelerate domestic manufacturing capabilities and strengthen economics of scale.

Initial estimates show that for the second consecutive year, caustic soda exports have exceeded imports in 2021-22. Compared to 2020-21 the increase in exports is expected to be close to 20% and the drop in imports is also likely to be about 20%. This is an encouraging trend that was aided by growth in demand and favourable international prices.

The Rapid Action Force (RAF) under the Ministry of Home Affairs approached AMAI for evaluating the effectiveness of mock drills on chlorine safety. The RAF team visited two chlor-alkali plants and oversaw the mock drills, appreciating the emergency response and preparedness.

Two dates in the month of March have importance for our industry: 4th March is observed as National Safety Day. In fact, the National Safety Council celebrates National Safety Week from 4th March. The Indian alkali industry accords high importance to safety at work place. The Safety, Health & Environment Sub-Committee of the Association meets regularly to discuss and review matters relating to safety in alkali plants. The Sub-Committee has also brought out handy compendiums on safe work practices in different areas of plant operations.

The other important date is 22nd March, observed as World Water Day. Universal and equitable access to safe and affordable drinking water for all is enshrined in the UN Sustainable Development Goals (Goal 6 of UN-SDG 2030). The Indian government’s Jal Jeevan Mission (JJM) aims to achieve assured tap water supply or ‘Har Ghar Jal’ to all rural households by 2024. On this year Water Day, we have achieved tap water connections to total of around 9.3 crore rural households. Launched in 2019, the mission envisages supply of 55 litres of water per person per day, to every rural household through functional household tap connections by 2024. The programme also includes water treatment and reuse, areas where chlorine plays a vital role in disinfection. AMAI has been promoting the use of chlorine for water disinfection/ treatment and propagating safe handling of chlorine, particularly in water works. JJM is expected to provide fillip to demand for chlorine, so far confined mostly to cities and urban areas.

K. Srinivasan
Secretary General
Leverage AI Powered Vision Analytics to Boost Annual Cost Savings by $250K+
Addressing Global Demands in Chlor-Alkali Industry
Kapil Malhotra, President AMAI and Head, Global Business Unit, Fluoropolymers, GFL Ltd

Opportunities for chlor-alkali, soda ash, chloro-vinyl in India.

Chlor-alkali market in India has witnessed healthy growth in recent years, largely driven by increasing demand from end-use industries owing to higher output from the chemicals industry. The market is expected to see high penetration rate in the Western and Northern regions of the country. At present, the market is highly fragmented and is gradually moving towards consolidation, particularly with the entry of foreign players and expansion in distribution network of existing players.

Increasing demand for chlorine, caustic soda and soda ash is expected to drive growth of the chlor-alkali market. Growing demand of glass from construction, automotive, packaging and other industrial applications is also expected to boost the market growth as soda ash forms an essential component of glass products. Rising demand for vinyl polymers will augment chlor-alkali market growth as vinyl manufacturing requires the use of chlorine. Chlorine is used to produce a variety of downstream chemicals, including polyvinyl chloride (PVC). PVC usage in numerous end-use sectors is rapidly rising, presenting profitable growth prospects for chlor-alkali market participants.

The Indian Chlor-Alkali industry holds enough capacities to cater to its entire domestic demand. With more capacities scheduled in the future, the Indian government needs to reach a balance by increasing protection for the locally produced chemicals while relieving pressure from the downstream industries to back larger manufacturing of goods. This would require rationalization of duties on various products that can help drive the domestic manufacturing.

R&D and innovations in chlor-alkali, soda ash, chloro-vinyl industry.

The mercury cell process emits mercury through the discharge while manufacturing chlorine and caustic soda which can poison freshwater resources if not treated before disposing into the environment. The Indian chlor-alkali industry has invested over INR 5,000 crores during the last ten years to phase out mercury cell technology and adopt membrane cell technology. In 2017, the government mandated compliance to Bureau of India Standards (BIS) specifications, that necessitated the industry to produce and import superior-grade caustic soda using the modern and more energy efficient membrane-based technology that has no harmful impact on human health and environment.

Emerging technologies are under development, for instance, a modified membrane cell using oxygen depolarized cathodes. This process requires pure oxygen to be fed to the unit, leading to the production of water and allows energy savings as no hydrogen gas is produced.

Chlor-alkali industry being an energy intensive sector strives to reduce energy consumption. A major part of energy is spent in electrolytic cell comprising of membranes and electrodes. Developments in membrane design/electrode coatings help enhance life of membranes/electrodes and improved cell efficiency. Technology suppliers are making a consistent effort towards R&D to bring forth more efficient cell designs through new advances.

Kapil Malhotra, President AMAI and Head, Global Business Unit, Fluoropolymers, Gujarat Fluorochemicals Ltd talks at length about the huge scope that the chlor-alkali, soda ash and chloro-vinyl industry has in terms of innovation and exports opportunity for Indian manufacturers.

The chlor-alkali industry has also enabled applications in diverse industries for myriad of problems such as:

- Super-conducting titanium dioxide nanofibers are used in air-purification and solar cells. Titanium dioxide is also being used in augmented and virtual-reality devices and is purified using chlorine chemistry.
- Caustic soda is used to harvest bioethanol from algae, recover phosphates (valuable crop nutrients) from household wastewater and to recycle (semi-) precious metals from old electronics.
- Combination of chlorine and UV radiation is used to purify and reuse wastewater in water-deprived areas.
- Novel cancer-treatment drugs based on cisplatin (a chlorine-containing medicine) have shown promise in the fight against testicular cancer.
- Concentrated caustic soda can be
used to efficiently store heat in our homes for later release when it gets cold at night.

• Hydrogen, a valuable co-product of chlor-alkali production, could be used as a potential power source.

International business activities in the chlor-alkali industry.

The growing industrialization in emerging economies such as China, India, South Korea, Indonesia, Thailand, Taiwan, Mexico, Brazil and Argentina is expected to drive the chlor-alkali market in the coming years. High demand from the packaging, building & construction, consumer goods and automotive applications in these countries increases the need for plastics, aluminum and others used in these applications. The growth of the manufacturing industry in Malaysia, Vietnam, Colombia and Chile is also expected to fuel market growth.

Both chlorine and caustic soda are in demand in Indian markets. Though Indian companies have chlorine in excess, they cannot export it because of the major hazards associated with transportation. Chlorine is also listed as one of the toxic and hazardous substances banned for trans-national transportation under the Basel Convention on hazardous wastes. As a result, India has to deal with the rising chlorine stock that cannot be disposed while dumping of caustic soda is forcing the sector to compete with low global prices. This is unviable for the sector as the production costs are high.

The present duty levels of 7.5 percent over caustic soda imports have not been able to impact the imported volumes. Additionally, the termination of anti-dumping duty (ADD) over imports from several countries has exposed the local industry to bigger risks at the time of crisis. As per the recent trade statistics, the caustic soda import volumes have remarkably risen in the past few months.

There is a good scope for exports as domestic industry is self-sufficient and can produce, as the demand grows either from domestic consumers or from other countries. In the current year 2021-22, after many years we are with positive trade balance with exports surpassing imports of caustic soda. With recent ease of business reforms by Indian government and single window clearance procedures, the investments and licensing have been facilitated in the country.

Raw material requirements and sourcing for chlor-alkali industry.

The value chain of the chlor-alkali products ranges from the sourcing of raw materials (salt and limestone) to the delivery of the final product to end-use industries such as EDC/PVC, glass, water treatment, chlorinated intermediates, alumina refining and glass. The chlor-alkali manufacturers normally have mines for salt from which they get the raw material (salt).

Raw materials of the chlor-alkali electrolysis are salt (NaCl or KCl) and water (H2O). Sources of salt include sea water (solar salt NaCl), mineral deposits (rock salt NaCl or KCl) or salt produced by brine evaporation (vacuum salt NaCl or KCl). Most of the major corporations that produce chlor-alkali, soda ash and chloro-vinyl are vertically integrated and they produce products such as EDC/ PVC and chemicals. Additionally, the products manufactured by these companies are used by other industries such as pulp & paper, water treatment, food, and metallurgy.

Challenges faced by chlor-alkali, soda ash, chloro-vinyl industry.

Challenges faced by chlor-alkali industry

The chlor-alkali industry is power-intensive and the industry has invested substantially in setting up captive power plants due to unreliable and expensive grid power. Power costs constitute nearly 60 percent of the overall cost of production. With power costs in India relatively high, the domestic industry is at a disadvantage when compared to many countries from which imports come in.

Inadequate trade protection measures result in unregulated imports and low-capacity utilization of the domestic industry. About one-fifth of the demand is met through imports and to an extent, the domestic capacity utilization is curtailed.

Ecological impact of the chlor-alkali industry is one of the deterrents for the industry. As chlorine is very toxic, its leakage and release in the environment are closely monitored. The occurrence of dioxin in pulp and paper-based products and chlorinated organic compounds in pulp mill effluents are grave issues for environmental safety. Chlorine derivatives also have negative impact as they lead to ozone layer depletion and thus, their use is being constrained. High concentration of caustic soda in water bodies has a harmful effect on marine life. The synthetic soda ash manufacturing process leads to environmental problems because of the effluents containing highly visible pollutants. All these concerns act as restrictions for the development of the chlor-alkali market.

Challenges of the soda ash industry

The Indian soda ash industry has satisfactory capacity to completely meet domestic demand. Nevertheless, countries with huge excess capacities have an easy access to India for dumping their produce. Consequently, the Indian industry is confronting the challenge of under-capacity use. The availability of raw materials has encouraged almost the entire capacity to be concentrated in
Challenges of the Chlor-Vinyl industry

Availability of feedstock for the vinyl chain is a major challenge. Domestic manufacturers have to largely depend on imports of feedstock and intermediaries. The comparatively low import duties on PVC also do not offer adequate margins to attract investments. The duty differential between intermediaries (EDC and VCM) for producing PVC and imported PVC does not offer an advantage for domestic value addition.

Role of the AMAI association towards industry support and growth.

Alkali Manufacturers Association of India (AMAI) actively interfaces with the government and other agencies at the centre and state levels. The association also works closely with international professional bodies like World Chlorine Council, Euro Chlor, The Chlorine Institute, American Chemistry Council-Chlorine Division and is also represented in these organizations. AMAI proactively promotes the industry through practices that are fair, inclusive and sustainable including but not limiting to following initiatives:

- Promote sustainable growth and development of the Indian Alkali and Chloro-Vinyl industries
- Holistic development considering the local, regional & global perspectives to sustain the industry
- Improve Chlorine Safety Performance
- Encourage Members to continuously improve performance through various methods including Responsible Care
- Promote Resource Conservation
- Promote sound management of Chemicals
- Disseminate information on rules, regulations, laws, Govt. notifications, Technological Developments and ensure compliance
- Educate Industry on current & emerging global issues impacting industry & Environment through Seminars/Conferences/Plant Visits
- Address important areas like Sustainability of Chlorine Chemistry through Chlorine molecule campaign
- AMAI endeavours to promote the growth of the Alkali and Chloro-Vinyl industries and thereby contributing to the country’s economic growth.

AMAI submitted the plea that alleged that low priced imports from Japan, Iran, Qatar and Oman are causing material injury to the domestic industry and are hence affecting the profitability of local producers. As a result, in 2020, commerce ministry’s investigation arm, Directorate General of Trade Remedies (DGTR) had issued a notification regarding initiation of anti-dumping probe on the Caustic Soda imports. However, despite positive recommendations from DGTR, Ministry of Finance did not accept the recommendations.

AMAI is running a series of training programs on “Chlorine Safety and Emergency Preparedness” for local water treatment facilities and municipalities in various Indian states. This initiative aims to help raise awareness on the benefits of chlorine, whilst demonstrating how chlorine can be safely handled, used and what to do in an emergency. AMAI members are making adequate availability of chlorine at all locations to meet the enhanced demand for drinking water disinfection and the Alkali industry is fully committed to supporting the government’s effort.

AMAI is also advocating use of chlorine to disinfect water and wastewater. The association has been imparting free training to municipal water treatment and sewage treatment personnel on chlorination techniques and safe handling chlorine. The chlor-alkali industry also produced sodium hypochlorite and calcium hypochlorite, recommended by WHO for cleaning of surfaces and disposal of infected masks. The industry is fully geared to meet the rise in demand.

Growth momentum of the industry post the pandemic outbreak.

In 2020, the Chlor-Alkali market saw a decrease in growth rate due to COVID-19 severely impacting the North American and European nations. Numerous manufacturing activities were deferred as a precautionary measure. Supply-chain disruptions impacted the chlor-alkali and other end-use industries decreasing the demand by over 5 percent in major application areas.

Expansion schemes across the globe were postponed resulting in a decline in demand for chlor-alkali. The demand for the chemicals, organic and inorganic chemicals reduced across the world. Interruption in construction, infrastructure projects and water treatment projects impacted the demand for PVC across the globe, in turn, impacting the chlorine market. Decline in automotive industry further reduced the demand for glass and polymers.

To alleviate the effect, chemical companies need to emphasize on operational efficiency, cost management, and asset optimization. Key players also need to focus on long-term prospects such as emerging applications, innovations, reviewing customer buying behavior patterns, and accepting new business models that help create continued growth. According to the Indian chlor-Alkali industry it may take longer than anticipated for the domestic chlor-Alkali demand to reach pre-covid levels.

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PIPELINE CORROSION AND CONTROL (Part-2)

Real life case examples

Dr. S.K. Chakravorty, Consultant (Plant Engineering)

Introduction

A review of the different types of corrosion is often helpful in initially determining the likely corrosion cause. In many cases, however, a combination of conditions will exist within the same piping system. India is going to become a global hot spot for ‘water insecurity’ by 2050 (Economic Survey report) and hence conservation of water in our country must be done on a war footing. There is an acute water crisis in several parts of India. Our country is primarily an agricultural based country requiring very high amount of water which is about 50% of our total available ground water. Out of the remaining total groundwater availability, we use 10% for domestic purpose and another 40% for industrial purpose. Therefore, different corrosion types and failure conditions particularly in water pipelines have been discussed in this article.

1. Piping Failures

A piping failure is often the first sign of a corrosion problem. Yet in many examples, signs of an impending pipe failure have been evident for months or years, and gone ignored. Failures can be minor (in the form of a pinhole leak) or catastrophic, with significant losses due to water damage as well as the cost of pipe replacement. Figure-1 shows a catastrophic piping damage due to uncontrolled corrosion leading to heavy losses.

Pipe repairs take on various forms, ranging from temporary clamps to the replacement of entire piping systems. In many examples, the denial of a corrosion problem results in multiple or staged repairs over years, wasting valuable time that could have otherwise been used to correct the problem and minimize far greater corrosion damage. All too often, one or multiple individual failures are fixed without further investigation into the hidden cause.

The absolute reliance on favourable but typically inaccurate corrosion rate data presented by corrosion coupons, often in contrast to blatantly obvious physical indicators such as thread leaks and high rust deposits, allows a high corrosion condition to continue unabated, thereby producing a much greater repair problem once the true corrosion problem is finally realized.

2. Pipe Thread Leaks

Every pipe thread is an inherent point of weakness, with approximately 50% of the pipe wall cut away. Often, a thread leak is the very first sign of a corrosion problem and will prompt further investigation. Left to continue unaddressed, however, total pipe separation often occurs to produce devastating water-related damages.

While the condition of large piping mains is normally the greatest concern to a building or plant manager, it is the threaded pipe that typically causes the greatest damage.

A high pitting condition will cause failures at random areas of the threads, allowing water to pass through, even though sufficient pipe wall remains to prevent a larger failure. For small leaks where the rate of evaporation exceeds water loss, dissolved iron oxide and other deposits accumulate at the threads to suggest a corrosion problem originating at its outside surface. In reality, however, it is an internal corrosion problem. Figure-2 depicts an image of pipe thread leak due to corrosion.

For more uniform but high corrosion activity, a more dangerous condition exists at the threads since the pipe wall is reduced more evenly and does not provide the telltale leak indication of a problem. For all forms of thread leaks, the potential always exists to suffer a total thread failure.

3. Galvanic Induced Failure

Galvanic corrosion can occur when different metals are joined together, and are greatly dependent on already existing corrosion conditions and the
The corrosion of steel piping and its related components is a continuous and virtually unstoppable process. The end product, which is commonly referred to as rust, is simply the result of an electrochemical reaction through which the higher energy-processed metal is slowly reverted back to its naturally occurring form: metal ore.

4. Interior Pipe Deposits

Internal rust deposits, commonly termed tuberculation, are an inevitable death sentence for most piping systems. They are the lighter and less dense end product of steel pipe corrosion. Once established by high and uncontrolled corrosion conditions, internal deposits initiate much greater deep pitting.

The highest corrosion loss is more likely at horizontal lines and in low flow or dead end areas where rust and other deposits will settle, but can affect vertical lines and main risers as well. Random areas of high tuberculation are actually the result of a high pitting or cell corrosion condition directly beneath it, with the volume or height of the rust deposit directly proportional to the depth and volume of pipe wall loss. Figure-4 shows images of internal rust deposits due to corrosion/pitting of horizontal pipes.

5. Insulation Failure

Contrary to manufacturers’ claims, standard fibreglass insulation provides an ineffective moisture barrier for cold water pipes. Condensed area humidity then produces a secondary, and typically hidden, corrosion condition at the pipe exterior. Most common at chill water and dual temperature systems, external corrosion losses will well exceed internal corrosion rates by up to 10 times or more.

Over decades and hidden from view, insulation failure can destroy entire piping systems. In most examples where the insulated pipe is not hidden from view, an insulation failure problem is very easy to recognize.

Missing, damaged, walked on and broken insulation defines a likely problem worth investigating. Water damage, dripping pipe, discoloration or crystallization of the outer insulation surface is further signs suggesting a potential problem. Aluminium and vinyl outer jacketing provides little resistance to moisture migration, but does shield the often telltale discoloration of the below insulation from view.

In addition, vinyl jacketing often holds the water condensed at the cold pipe surface, producing a much greater threat of exterior pipe corrosion. The threat of insulation failure is greatest in smaller diameter piping due to its inherently lesser wall thickness combined with generally thinner insulation applied. Lower temperatures at supply side piping can significantly increase this threat. Figure-5 shows the picture of insulation failure of a chill water pipeline causing corrosion on the exterior surface.

6. Weathering Damage

Of all the forms of corrosion caused to piping systems, weathering damage due to rain, snow, atmospheric conditions or cooling tower overspray is the easiest to prevent. The piping is exposed and accessible, with
corrosion activity always visually obvious. Figure-6 depicts the image of weathering damage of a water pipeline near a cooling tower due to water spray falling on it.

Most weathering damage requires decades to produce a failure, and is simply due to a lack of maintenance. Smaller diameter piping is always most vulnerable due to its inherently lesser wall thickness.

7. Under Deposit Corrosion

Under deposit corrosion represents one of the most damaging forms of corrosion to a piping system. Often called “cell corrosion,” it is typically very aggressive and localized, causing deep penetration of the metal surface with lesser general corrosion in the surrounding areas. Due to surface deposits, electrical imbalance, or some other initiating mechanism, all corrosion factors attack a select number of individual sites.

In some cases, pitting is extended throughout the entire metal surface, giving it an irregular or very rough surface profile. In other instances, pits are concentrated in specific areas, leaving the majority of the metal surface in a like-new condition. Galvanized pipe is highly susceptible. Microbiological attack is often associated with under deposit corrosion. Regardless of the underlying reasons for an internal piping deposit condition, the presence of rust deposits signals a multitude of potential problems to varying degrees.

Therefore, effectively removing such deposits so that chemical inhibitors can again reduce corrosion losses must always be considered a highest priority.

8. Corrosion under Insulation

Corrosion under insulation (CUI) is a widespread and typically hidden threat. The underlying source of the problem is a misconception that fibreglass and/or soft foam insulation provides a moisture barrier, and is the primary choice of insulation based on reducing heat transfer, rather than reducing humidity migration.

Most cold water piping has insufficient insulation thickness, is of the inappropriate type, is improperly installed or all three. Damage, breaks and areas of missing insulation allow the easy migration of moisture. Figure-7 shows an image of a corroded cooling water pipeline under insulation.

Smaller diameter pipe is more vulnerable to CUI due to the typically lesser insulation thickness applied and inherently thinner pipe wall.

The addition of threaded ends adds another layer of vulnerability for smaller pipes commonly found at chill water and dual temperature systems.

9. Missing Piping Insulation

Insulation at steam, condensate, and other hot water lines is needed to prevent heat loss, it is even more important to chill water and cold piping services since moisture condensation can severely damage the pipe. Proper insulation is often overlooked, resulting in potentially significant piping and equipment damage.

Drain lines, vents and other small diameter fixtures that are unlikely to produce any measureable heat transfer loss from the system often remain un-insulated, ignoring the threat of constant sweating and exterior pipe wall loss due to corrosion. Figure-8 shows the picture of sections of chilled water pipeline left un-insulated after maintenance work leading to corrosion.

10. Wet Pipe Insulation

Enough water can be hidden inside pipe insulation to suggest an actual piping failure when opened. This is due to the fact that fibreglass insulation offers very little true moisture barrier and allows humidity to condense at the cold pipe surface.

Wet insulation is therefore a sure sign of some form of a problem.
with fibreglass insulation; water will eventually penetrate to the outside to produce wetness, discoloration, and crystallization, thereby providing telltale evidence of a problem. Figure-9 depicts evidence of wet fibreglass insulation in a pipeline (discoloured patch on the outside surface). If acted upon, corrosion under insulation (CUI) problems can be avoided and the often mild deterioration present at early stages of such a problem can be corrected. If allowed to continue, substantial piping damage is likely to take place.

An aluminium or vinyl jacket covering over otherwise improperly or insufficient insulation can actually hide the build-up of water at the pipe and allow years of additional damage to take place. In multiple cases where grooved or clamped pipe was in use, the accumulation of water inside its vinyl elbows, tees or other fittings severely deteriorated the absolute weakest link in the entire piping system—its connection bolts—to cause catastrophic failure.

11. Microbiologically Influenced Corrosion (MIC)

MIC is, by far, the most severe and threatening form of corrosion to HVAC (heating, ventilation, and air conditioning) piping and fire protection systems. It is caused by the presence of various microbiological agents under specific environmental conditions and can, in some cases, result in an advanced and widespread failure of entire piping systems within only a few years.

An MIC presence usually signals a very severe threat to the entire system, requiring extensive cleanings and repeated sterilization at great expense. For many affected systems, MIC cannot be eliminated, and an elevated corrosion and pitting condition will exist for the remainder of the life of the system.

It produces large and deep pits due to its utilization of the steel pipe itself as an energy source (often as an alternative to oxygen), as well as through the production of strongly corrosive metabolic by-products, such as sulphuric acid, which further assist the microorganism in dissolving pipe metal. Figure-10 shows MIC induced corrosion indicating large/deep pits in a HVAC system pipeline.

MIC exists in varying degrees of severity, and is not exclusive to carbon steel piping systems or open condenser water systems. MIC is commonly found in closed chill water piping, especially those winterizing with glycol, and has been documented to destroy copper, brass and stainless steel pipe.

12. External Corrosion

More pipe damage due to external (outer surface) corrosion than internal causes has been documented. Most is due to insulation failure and the fact that it is hidden from view until a leak, maintenance or some other event prompts a visual investigation.

Un-insulated pipes, such as roof level condenser water lines; a surprisingly high volume of pipe is left to deteriorate and could have been avoided through simple maintenance. Figure-11 shows a severely pitted un-insulated roof level condenser water pipeline.

The severity of an outer surface corrosion problem can be misleading, in most examples, surface rust is minor in the beginning, and can be easily addressed by the maintenance staff by mechanical wire wheel and the application of an effective rust reverser and outer protective coating. Left to continue, surface rust develops into stratified layers under which deep pitting accelerates, and against which only sand blasting will prove effective at its removal.

13. Cooling Tower and Exchanger Corrosion

The first sign of a corrosion problem is usually revealed at the cooling tower. Rust deposits at the pans represent the pipe wall that was once part of the circulating system. White deposits at the tower fill represent a potential scaling condition.

Discoloured and turbid water are yet another indication that corrosion activity is high and that chemical water treatment is lacking. Algae and other organic growths not only interfere with operations, but also accelerate many other corrosion processes and promote microbiologically influenced corrosion.
MIC). Figure-12 depicts MIC of cooling tower pipes due to growth of algae and rust deposit.

In many cases, cooling tower maintenance and the removal of rust deposits is performed without ever investigating the underlying cause of the problem—and without considering that the volume of rust deposits exposed at the tower is nothing compared to the volume of rust deposits still inside and firmly attached to its walls.

Most heavy rust deposits are produced after decades of high corrosion activity, only falling loose to be carried to the cooling tower after some form of shock to the system, such as a spring start-up or temperature change. They are rarely captured by most filtration systems or removed or dissolved by most chemical adjuncts.

14. Corrosion due to Soft Foam Pipe Insulation

Soft foam insulation allows moisture to infiltrate to cold pipe surfaces and produce destruction of the steel pipe. Over a relatively short time, soft form insulation deteriorates—hardening, cracking and shrinking to produce large gaps for moisture to enter. In addition, the foam actually degrades chemically to become slightly acidic, bonding itself to the pipe or rust layers so securely that removing old soft foam insulation becomes extremely difficult.

Where high humidity is present and condensation to a cold pipe surface is a serious concern, hard cell “foam glass” insulation is overwhelmingly recommended. As a second choice, a heavier thickness of fibreglass, painted with a high solids coating to act as a moisture barrier, is an option. Soft foam insulation should only be used for temporary or short-term applications. Figure-13 shows corrosion of a cold pipeline due to degraded soft foam insulation (moisture ingress).

15. Copper Pipe Corrosion

High corrosion losses at copper pipe resulting in failure are rare. Contrary to common belief, however, copper is not immune to the effects of corrosion. Corrosion conditions resulting in high corrosion losses against steel pipe, and possibly copper lines. Figure-14 shows HVAC system copper pipe heavily corroded due to low pH water containing iron oxide.

16. Brass Dezincification

Brass is found less and less at most commercial properties, having been replaced by easier to install and far cheaper Type L copper pipe. Corrosion activity at brass pipe is typically very low, allowing it to easily provide nearly 100 years of reliable service.

Under certain water quality conditions, however, and where the water supply is more aggressive, the zinc chemical component is leached out of the brass to produce small pinhole failures or fractures and splits. Greenish-white deposits are a common signature of dezincification, which can be confirmed by metallurgical lab analysis. Figure-15 shows dezincification of hot water brass pipe providing pinholes and greenish-white deposits.

Brass is commonly found at older domestic hot water piping systems instead of galvanized pipe due to the negative effect of heat against the zinc protective coating.

17. Steel-to-Steel Electrolysis

Microvolt differences in ground potential between building piping and the building’s structural steel has been cited in some examples of much localized pipe failures. This normally occurs at steel piping supports and
hangers, and with direct metal-to-metal contact.

Requiring highly sensitive electrical instruments to make a positive diagnosis, ultrasonic testing performed further removed from the area of failure will often show far less and even normal corrosion activity.

Although this form of electrolysis rarely occurs, we consider it prudent to insulate metal to metal contact, and especially where steel pipe is exposed to water, cooling tower overspray, and other weathering conditions. Figure-16 shows corrosion in steel pipe supported by steel structure having direct metal to metal contact due to grounding potential difference between pipe and structure and weathering effect.

**Conclusion**

Most high-corrosion scenarios result from years of problem conditions that have gone unrecognized, unaddressed or ignored. Often, it is inherited from a previous owner or operator who was not effective at controlling a corrosion problem, and/or was obviously not concerned. Also it has been observed that, total reliance and blind trust in corrosion coupons have allowed years of sky-high corrosion to continue unabated. A combination of less effective corrosion control chemicals, lower quality and less corrosion-resistant metals, and less tolerant design engineering practices have made the need to closely monitor corrosion losses more critical today than ever before. The case examples illustrated above will help corrosion and maintenance engineers to combat pipeline failures to a great extent.
Introduction
Across all sectors and industries, today’s business environment doesn’t leave any room for stagnation and staleness. In fact, businesses not in a state of constant growth and expansion are all arguably considered failing or, at best, old-fashioned and too conservative. Therefore, being successful in such an environment necessitates a will for growth and a practical plan and infrastructure enabling it to realize that will.

In this article, we’ll discuss why chemical businesses in particular may not grow as they should and how ERP helps keep check on raw materials, finished goods and inventory. Listing down the challenges and the possible solutions extended by ERP for the same.

1. Units of Measures: In any chemical company, the raw material used can be measured in various units such as Kilograms, litres, numbers & even Bars. It is quite often that they are purchased in one unit of measurement and consumed in another (eg: formulation of a tablet) Hence the accounting of materials needs to be done in more than one unit of measure. The conversion between different units of measures had to be considered.

The right ERP solution will record the total material used and required for that process with the built in conversion calculator. The intelligent software will also predict the amount of material required to be fed in.

2. Batch tracking and Shelf Life: Mostly chemical industries produce products in the batches. The batches are required from the point of purchase to production and consumption. The inventory evaluation is also based on the batches. Further the batches would be associated with the
attributes like the expiry date of the products.

ERP Solution – The tool will track the inventory expiry date since it is a regulatory requirement since there will be manufacturing date and expiry date already mentioned at the time of production.

3. Pricing: Pricing of the finished / semi finished products in not always based upon the cost of materials or market determined. Often additional processing is required to achieve materials of higher quality and associated costs very. Multiple end items may require that the cost of the entire process to be split based upon a percentage split of cost. The production of all items – (intermediates, semi finished goods, finished goods etc) is taken up batch wise. Hence the costs for various activities need to be consolidated batch wise.

4. Multiple versions of Formulations: It is possible that the finished material is produced according to the different rations of raw materials or some different raw materials are used in the process. The formulation definition has to be flexible to accommodate multiple versions.

5. Damaged Stocks Management: For the sake of profitability, the management of the damaged stocks plays a critical both in terms or value as well in terms or logistics. The organization needs to manage & monitor the quantity & value of its damaged stock. The ERP system needs to track the damaged stocks at the various ware houses, locations etc.

6. Warehousing and processing: The logistic requirements of the industry require stocks to be maintained at various locations (ware houses, stock points etc). This obviously puts additional pressure on the supply chain as well as on Working capital management. Further, the need to maintain the stocks as semi finished goods adds that extra work on the ERP & Supply Chain planning engine. Management & control of stocks across the value chain is an essential.

ERP automates and mechanics these day-to-day tasks and missions, freeing up valuable time for the workforce to be in a position to more efficiently contribute to the growth and expansion of the organization. They’ll be doing what they should be undertaking – focusing on the core pillars of the business toward generating maximum revenue.

Legacy Infrastructure

It’s been decades since the advent of ERP (Enterprise Resource Planning) systems in businesses as tools that help companies efficiently manage resources and access helpful insight and information on overall performance and direction. However, being fixated on one or a couple of aspects of their functions has led their users into treating them as mundane and routine parts of their day-to-day work.

Most companies have some form of legacy automation or ERP system in place. Some of these systems are still being used and updated regularly for the benefit of the organization’s requirements. But many of them have slow and unnecessary trouble-making software that’s near useless, if not completely obsolete.

The fact of the matter is, if companies were to continue utilizing their legacy ERP systems without any changes, their future would be more of the same, ho-hum business as usual, without any prospect for growth or any new development. In order to achieve meaningful advancement in any industry, it’s vital to truly comprehend the requirements of the day in your sector and act compliant with those needs. Replacing the old system with an agile ERP capable of solving problems forthwith is critical to reaching sustainable business growth.

Assimilation & Synergy Among Departments

An ERP solution’s primary task is to create a shared space where all departments inside the business can work together as an efficient unit. Timely and well-directed access to the flow of tasks and information at all times helps all the components of an organization to function seamlessly towards the clear-cut objectives obvious to all members.
This objective connection and assimilation of tasks on a unified and comprehensive platform will also help executives to acquire a more transparent view of their organization at all times, providing them with a valuable standpoint from which decision-making can become significantly less challenging.

**Helpful Insights in Real-Time**

Working with a reliable ERP that covers all aspects of a business provides decision makers with the opportunity to accumulate valuable information. This data will then, in turn, help assess and understand not only the status of one's own business but also the requirements of clients and the areas where one needs to put more work.

Even though many organizations are more than prepared to spend significant chunks of their development budget on studies to obtain insights into their business, with an efficient ERP, one will have at one's disposal all the requisite information for growth. The ERP will also assist in monitoring and evaluating the degree of success (or lack thereof) of plans and objectives throughout the process.

In fact, probably the most valuable takeaway of an ERP system implementation is the organization’s leaders will likely have a more holistic understanding of their company and how it works, where it’s headed, and how to plan and execute based on its roadmap.

**Keeping In Touch At All Times**

A significant takeaway from the global COVID-19 pandemic for all business leaders has been to understand the need for a comprehensive system enabling them to keep track of how each task is being handled. ERPs solve this issue by providing executives with the means to be in the know at all times, empowering them to make informed and timely decisions to enhance the growth of their business.

**Implement ERP & Start Your Growth Now!**

It’s safe to state growth for any organization is only achievable through practical planning, efficient management and systemic monitoring. ERP helps businesses grow by freeing up their time, resources, etc., allowing them to focus on the core aspects of their business toward generating maximum revenue.

(Reproduced with permission from Chemical Industry Digest, 4th March, 2022)
The War in Ukraine and its Impact on the Chemical Industry

Ravi Raghavan, Editor, Chemical Weekly

The impacts on energy markets due the war in Ukraine have been substantial and immediate. Prices of natural gas and crude oil have soared to record levels, due to the restrictions posed on Russian supplies, and there are grave concerns that there is more bad news to come. Energy markets were already on the boil, due to a sharp recovery in demand, as COVID abated in most parts of the world and economic activity was expected to regain the momentum lost over the last two years.

Energy shock for India

India has always been particularly vulnerable to energy shocks, given its near-80% dependence on oil imports, and only a slightly lower level of dependence in the case of gas. Russia has never been a significant exporter of oil to India – preferring to send it to energy-starved countries in Western and Eastern Europe, or to China. Prior to the war, Russian imports accounted for just about 2% of India’s total oil imports – with the bulk of the supplies here coming from the countries of the Middle East, partly under contractual obligations. The situation in the case of gas is also similar, and most of the LNG imported into the country now comes from Qatar (through contractual arrangements) and some of the newer sources in Australia and elsewhere.

The much greater impact of the war on India stems from the fact that it has pushed up prices for all oil and gas – irrespective of where it is coming from. Though the public sector oil companies here are seeking discounted oil supplies from Russia, this may not make much of a difference to India’s oil bill, coming as it does at very elevated price levels compared to that prevailing before the beginning of the conflict. Some of the gains in price will also be eroded by the challenges of transporting it without running afoul of international sanctions on Russia, or arranging for roundabout ways for paying for it.

Any discount, though welcome, will also not be so substantial that industrial users or individual consumers will not feel the impact in the form of higher prices for industrial & automotive fuels, aviation fuel, cooking gas (LPG), and piped natural gas (PNG). The first price hikes – for industrial consumers of diesel – has just been imposed, and individual consumers too have seen the first of many rounds of increases that will come now that elections in several States have concluded and none is imminent anywhere else in the country.

The domino effect of fuel price rise will be considerable and become evident in the weeks and months ahead, unless, of course, a quick resolution of the crisis comes about.

European chemical companies: caught between a rock and a hard place

For the chemicals industry, the impacts of the conflict have not been very significant. Neither Russia or Ukraine are large producers, consumers or exporters of petrochemicals, and the war is unlikely to affect demand-supply balances for most chemicals in any significant manner.

Russia’s chemical production represented just 1% of global chemical output in 2020, and its imports/exports from/to the EU were estimated at ~$10-bn and $6.5-bn respectively. For most chemical companies, Russia is not a very important market, though their level of exposure varies. German chemical companies have possibly the greatest exposure – with some 2.4% of total
chemical exports, worth $6-bn, going to Russia in 2021, according to VCI, the German chemical industry association. BASF is most exposed, owning 67% of Wintershall Dea, an oil & gas producer active in Russia, besides having a stake in the gas pipeline, Nord Stream 2. In an official statement on its website, BASF has said it has stopped conducting new business in Russia and Belarus (a neighbouring country aligned with Russia) from March 3, except for products supporting food production. It has also flagged the responsibility for the safety of its production sites in Russia, and added that it will evaluate these decisions on an ongoing basis.

Several other chemical manufacturers have cut ties with Russia (and in some instances, Belarus) – mostly partially. The list includes Bayer, Clariant, Chemours, Dow, DuPont, Henkel, Honeywell, Kemira, LyondellBasell, Novozymes and Solvay. Dow, for example, has said it has stopped all investments in Russia, and will only supply limited essential goods including food packaging, hygiene and cleaning inputs. Bayer too has halted supplies of non-essential goods and services, but will continue to offer its seeds, agrochemicals and health products.

The war has also stopped at least one deal in the making – Austrian petrochemical maker, Borealis was to sell its nitrogen fertiliser business to EuroChem for $520-mn. While the latter is based in Switzerland, most of its assets are in Russia, and its founder has been individually targeted for sanctions.

**Expect project cancellations and delays**

Nearly all of the industry majors have said that they are disengaging from new projects, particularly with state-owned entities. The fate of joint ventures and technology licensing arrangements for projects underway is not clear, and companies have been understandably circumspect about what they plan to do, given the legal ramifications. In any case, economic sanctions and restrictions on air travel will mean significant delays in implementing projects.

Senior executives of Sibur, the largest petrochemical producer in Russia, have been specifically targeted for sanctions, but the company has been at pains to point out that neither it or any of its subsidiaries in Russia or abroad are impacted. Sibur is involved in several projects of which the largest is the $10-bn Amur Gas Chemical Complex, which includes world-scale plants for olefins and olefins. This is being implemented in a 60:40 partnership between Sibur and China’s Sinopec and had mid-2024 as a target for completion. While much of the output will be destined to meet the seemingly insatiable demand for petrochemicals in China, the project – like many others in the world – is dependent on technologies from western process licensors including Linde (for ethylene), Univation Technologies and Chevron Phillips Chemical (for polyethylene) and LyondellBasell (for polypropylene). Several international majors are also involved in building the plants.

**Impact on petrochemical markets**

For the global petrochemical industry, feedstock and energy costs are expected to rise. Most at risk will be the European naphtha crackers who will have to bear higher crude oil related costs, and even face supply disruptions (which has not happened so far). Competitiveness of aromatics production will also be compromised to some extent. In the best of times, steam crackers in Europe are at the high-end of the cost curve, and they have possibly been pushed further back due the present situation.

On the flip side, low cost cracker operators in the Middle East, North America and even the coal-to-olefin complexes in China, will stand to gain. Their advantage vis-à-vis naphtha-based petrochemical production had diminished somewhat in the era of

<table>
<thead>
<tr>
<th>India-Russia trade: Top-10 organic chemicals</th>
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<tbody>
<tr>
<td>Chemical</td>
</tr>
<tr>
<td>Acrylonitrile</td>
</tr>
<tr>
<td>Isobutyl alcohol</td>
</tr>
<tr>
<td>Hexamine</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
</tr>
<tr>
<td>Diisopropyl ether</td>
</tr>
<tr>
<td>n-Butanol</td>
</tr>
<tr>
<td>Acetonitrile</td>
</tr>
<tr>
<td>Phenol</td>
</tr>
<tr>
<td>Butylated hydroxytoluene</td>
</tr>
<tr>
<td>Soya Lecithin</td>
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</table>

Data is for April 2021 to Jan 2022 for imports and for April 2021 to Dec 2021 for exports
low crude oil prices, but they are clearly back with a bang.

Propylene markets are expected to tighten globally. Inventories of refined products are depleted, and refiners are likely to seek maximisation of fuels, even if it comes at the expense of propylene supply. Higher costs for LPG/propane will also impact margins for propane dehydrogenation (PDH) units. Most vulnerable will be non-integrated propylene-derivative producers that depend on the merchant market for the olefin.

**Impacts on India mostly related to fertiliser raw materials**

Russia and Ukraine are not very large suppliers of chemicals to India, save the exception of fertiliser raw materials. Nor are they important markets for India chemical producers. Take the case of ammonia. In 2020-21, the two countries exported 30-kt and 257-kt respectively of ammonia into India, mainly for use as raw material for the manufacturing of nitrogenous fertilisers (principally urea). Considering India imported close to 2.5-mt of ammonia during the last fiscal, this is not a level of dependency that cannot be worked around by tying in supplies from other sources (principally from the Middle East). Of far reaching significance will be the impact on prices, which were rising even before the troubles began.

In the case of muriate of potash (MoP), another fertiliser raw material, the import vulnerability is greater, though with Belarus. All of the MoP that India needs is imported, and in 2021-22 out of the 5.1-mt that came in, around 18% was from Belarus. Prices have soared in the last few months – from around $280 in November 2021 to $500 per tonne now, and could go higher. Indian importers are now seeking other suppliers to make up for the shortfall to mitigate the risks of disruptions (see report elsewhere in the news pages).

For other organic chemicals, the import & export dependence is not very significant (see Table).

The direct impact of the war in Europe may not be very significant for India’s chemical industry, but expect to see some disruptions in the months ahead. Of greater concern are the rising COVID cases in China, which is forcing unprecedented and large scale shutdowns in several provinces some of which are important centres of chemical production.

*(Reproduced with permission from Chemical Weekly, 29th March 2022)*
Green Hydrogen: Addressing Safety Concerns in Handling & Distribution

Professor Ganapati D. Yadav, Institute of Chemical Technology, Mumbai

A very pleasing policy announcement was made by the Ministry of Power on 17th February 2022 on green hydrogen and green ammonia, which was welcomed by industry. However, some cynics thought otherwise as regards the investment, government support and safety.

Let me begin by stating that hydrogen is safer than petrol and it is not a hydrogen bomb!

Green hydrogen will be the saviour of the world as part of the trinity along with solar and wind. Only hydrogen will give us chemicals and materials through the use of biomass and carbon dioxide, a greenhouse gas (GHG), as feedstock. Hydrogen economy can be elegantly intertwined to make many chemicals, materials, polymers and energy.

The aim of this article, based on science and technology, is to make the public comfortable and ready to accept the hydrogen economy, which is the only way to achieve the ‘net zero’ goal by 2050.

The February announcement will help India achieve the target of 5-mt of green hydrogen production and the related development of renewable energy capacity by 2030.

Hydrogen and ammonia (which on catalytic splitting gives hydrogen and nitrogen) are envisioned as future fuels to substitute fossil fuels such as crude oil, coal and natural gas. When produced using renewable energy, such as solar or wind, they are called as green hydrogen and green ammonia, respectively, and are seen as key for environmentally sustainable energy security of all nations.

The notification of the policy will have several benefits. For one, India will no longer be dependent on oil producers and their whims, as happened in October 1973 when OPEC imposed an embargo on oil exports. Carbon dioxide will no longer be a liability, but an asset, as a feedstock for refi

Ammonia synthesis and use

Ammonia, with its characteristics of zero-carbon and high hydrogen content, is increasingly acknowledged as a clean fuel. The well-established facilities for ammonia production and infrastructures worldwide for storage and transport provide ammonia with vital advantages, emphasising its role in enabling a clean energy future.

Ammonia can be decomposed into hydrogen and nitrogen, free of carbon emission, using an appropriate catalyst. Ni-based catalysts are preferred, as against Ru-based ones, with respect to cost and sources.

A rational design of catalyst in terms of preparation method, support and promoter is needed to whittle out a catalyst that is commercially reliable and affordable. Ni-based catalyst with long-term stability up to 1,000 hours has been reported.

Ammonia also shows promising potential for clean electricity generation via solid oxide fuel cells (SOFCs), exhibiting cell performance comparable to that of the hydrogen fuelled counterparts.

As per the recent government notification green hydrogen or ammonia manufacturers in India may purchase renewable power from the power exchange or set up renewable energy capacity themselves or through any other developer, anywhere. This will also create new jobs and provide a fillip to the Indian economy.

Types of hydrogen

As a clean energy source, hydrogen has received tremendous attention due to its favourable characteristics: wide availability; highest energy density per unit mass; high degree of environmental protection; renew-
ability through water splitting, etc. Meanwhile, with increasing number of vehicles all over the world, fossil fuel consumption has become one of the leading sources of environmental pollution.

Hydrogen production technologies are classified as grey, blue and green. Grey hydrogen is produced from natural gas with no carbon capture, while blue hydrogen is produced from natural gas or biomass with advanced carbon capture technology. Green hydrogen is produced by the electrolysis of water.

The estimated costs for these three types of hydrogen are given in Table 1.

Green hydrogen is seen as the best reagent to decarbonize industry and a carbon dioxide refinery can lead to production of methanol, dimethyl ether, formic acid, formates, hydrocarbons like petrol and diesel, green ammonia, green steel, green nickel, amongst others (Figure 1).

According to a Hydrogen Council and McKinsey report, large scale renewable hydrogen production costs are expected to fall to lower than $2.3 per kg and can break even with grey hydrogen production costs between 2028 to 2034. The US Department of Energy has stated that a price of $2.5 will be the most economical for the hydrogen economy.

Energy company, BP, predicts green hydrogen will be necessary to achieve the net-zero goal by 2050.

According to the company, the share of the renewable energy in the global energy mix will increase from the current

~27% to ~51% by 2035, and to ~73% by 2050, totalling 49000 terawatt hour (TWh). Hydrogen’s share will be

~25%, with only green and blue hydro- gen, and no grey (natural gas) or brown (coal) hydrogen required.

I have been working in the area of green hydrogen since 2006 with the assistance of ONGC Energy Centre (OEC), and hold several patents. The technology development by ICT Mumbai, called ICT-OEC technology, can produce green hydrogen at a cost of less than $1 per kg, for a capacity of 100-tpd (tonnes per day), along with co-production of 800-tonnes of oxygen. One kg of oxygen fetches $0.08 in the international market. We have obtained several patents and have several publications in this area, including on the carbon dioxide refinery, as well as blue hydrogen production.

### Safety concerns with hydrogen in vehicles

In a rather alarming article published recently, Mr. Swaminathan Anklesaria Aiyar, a leading economist-cum-journalist, questioned the safety of hydrogen, quoting some past incidences. He cautioned, “No matter how attractive green hydrogen may seem today, it is also dangerous. If the government and big industrialists spend lakhs of crores on developing it, this carries the risk of disaster and industrial collapse as with the Hindenburg. India should keep the proportion of green hydrogen in total energy modest, so that a shutdown after a possible disaster does not cripple transport and industry.”

This view is dangerous and serve as a fodder to ignorant people with vested interest like happened with the Jaitapur nuclear power project or the West Coast Refi. No country can advance without modern industry using clean, green and affordable processes. He also talked about the accident at the Fukushima nuclear power station in Japan, caused by an earthquake in 2011, and the Chernobyl

### Table 1: Estimated costs for different types of hydrogen

<table>
<thead>
<tr>
<th>Brown</th>
<th>Grey</th>
<th>Blue</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>Natural gas</td>
<td>Natural gas</td>
<td>Renewable electricity</td>
</tr>
<tr>
<td>Gasification No CCS</td>
<td>Steam methane reforming No CCS</td>
<td>Advanced gas reforming CCS</td>
<td>Electrolysis</td>
</tr>
<tr>
<td>Highest GHG emissions (19 tCO₂/tH₂)</td>
<td>High GHG emissions (11 tCO₂/tH₂)</td>
<td>Low GHG emissions (0.2 tCO₂/tH₂)</td>
<td>Potential for zero GHG emissions</td>
</tr>
<tr>
<td>$1.2 to $2.1 per kg H₂</td>
<td>$1 – $2.1 per kg H₂</td>
<td>$1.5 – $2.9 per kg H₂</td>
<td>$3 – $7.5 per kg H₂</td>
</tr>
</tbody>
</table>

Note: GHG – greenhouse gas; CCS – carbon capture and storage; tCO₂/tH₂ – tonne of carbon dioxide per tonne of hydrogen.

nuclear disaster of 1986, as pointers to the risks of nuclear power.

As an optimistic engineering scientist, I was further alarmed by other statement in the article, notably one stating: “It is an admirable, ambitious target that would be a boon for humanity. But what if he fails? If the massive investments proposed by Ambani, Adani and other players require huge government subsidies, critics will, rightly, call it cronyism.”

The statement reveals the lack of understanding of the history of technology – if a technology creates problems, another overcomes the defects or demerits of the previous one. The world has changed since the aforesaid accidents took place.

Since hydrogen is fi in compressed form in a tank, the general public thinks it is a bomb, which will explode if any accident happens. Is it more dangerous than petrol or diesel vehicles? The short answer is that while hydrogen behaves very differently from petrol, it is as safe as petrol or diesel in fuel tanks. The average petrol tank holds 3-4 times more energy than in the hydrogen tanks of Fuel Cell Electric Vehicles (FCEVs). Hydrogen is the lightest of molecules (about 14 times lighter than air), and although it is highly flammable, escaped hydrogen (burning or not) dissipates quickly and typically in a narrow column shooting straight up into the atmosphere.

FCEVs have arrays of hydrogen sensors that sound alarms and seal valves and fuel lines in the case of a hydrogen leak. The sensor technologies of yesteryears were primitive vis-à-vis modern ones; the latter can detect any leakage from the fuel tank, feed system, and the fuel cell stacks, allowing timely remedy.

Additionally, the pressurized tanks that hold the hydrogen are tested repeatedly by manufacturers and proven to be safe in collisions.

To summarize, hydrogen is no more dangerous than petrol. And petrol pump fires have not convinced people to stop filling their tanks!

Leakage issues

Another fear by environmentalists is that hydrogen will leak and deplete the ozone layer. This issue has been subjected to scrutiny in scientific work over the years and dismissed.

A UK report by Derwent in 2018 looked into possible additional hydrogen emissions into the atmosphere in a hydrogen-based economy, and determined it to be strongly dependent on hydrogen production volumes and leakage rates throughout the process chain. The latter will comprise of diverse entities: power generation, buffering, transportation, industrial energy, green steel, building heat & power, carbon dioxide refinery, ammonia production, etc.

It is necessary to develop, a cost-efficient transmission and distribution system for hydrogen. In the long run, a network of pipelines offers the most cost-efficient means of distribution, whereas in the short- to medium-term, the most competitive setup involves co-locating hydrogen production on- or near-sites that link resource-rich regions to demand centres via trucks, trains, refuelling stations, and smaller industrial users. Longer distances can be taken care of by shipping, where hydrogen could be supplied in a dense form. Several potential hydrogen carrier approaches are now available, including pressurization, metal hydrides, carbon nanotubes, etc. But the three carbon-neutral carriers will be liquid hydrogen, liquid-organic compounds, and ammonia. The end-use of hydrogen will decide as to which will be the most economical.

Another concern is about hydrogen leakage in the soil. Since hydrogen is the lightest of all gases, it does not ‘linger’ next to the soil, even if there is a leak. Many articles in the open literature show that biological sources and sinks of hydrogen are found in aerobic and anaerobic environments. In anoxic ecosystems, such as wetlands, freshwaters under the chemocline, marine sediments, and animal gastrointestinal tracts, hydrogen is mainly produced as a reaction intermediate product due to organic matter degradation by organisms from the three realms of life. The main biological sinks of hydrogen in anoxic
ecosystems are acetogens, methanogens, sulphate-reducing microbes, iron oxide-reducing microbes, and nitrate-reducing microbes. In oxic environments, such as upland soils, freshwaters above the chemocline, and open oceans, hydrogen is mainly generated by nitrogen fixation and consumed by both Knallgas bacteria and high-affinity hydrogen-oxidizing bacteria. Due to its energetic potential, hydrogen is quickly consumed by microbes within the same microenvironment, indicating that hydrogen production is likely the limiting step of the hydrogen biogeochemical cycle. This would show that there is no relation to the hydrogen economy.

End-notes

In the past, people talked about radioactivity of mobile towers and the dangers of using mobile phones; have they stopped using it? Do you know that X-rays in hospitals were opposed in the early days, as ladies blamed them for intruding on their modesty? NMR machines, without which hospitals cannot function today, were renamed as MRI machines, without the letter N (for nuclear), to overcome perceived public fears.

Modern life is not possible without motion. Do you abandon travel altogether for fear of road, rail or plane accidents? Majority of industrial accidents are man-made, which does not mean we should close industries and go back to the Stone Age.

Any loss of life or property, or injury, due to lack of safety measures is deplorable, but the scientists and engineers must provide solutions and increase safety to achieve zero casualty. As the hydrogen industry moves on, many of the anticipated and unanticipated problems will find solutions.

While hydrogen is a relatively new and unfamiliar energy source to the public, it has been used for long and safely in industries like chemical, metal, food, etc.

It is high time India adopts the hydrogen economy and promotes it by policy and funds. It was gratifying to note that the US and India have launched a ‘Hydrogen Task Force’ to develop clean energy, which is a testimony to its safety and relevance.

The advent of time and avalanche of modern scientific and engineering knowledge, will clear all doubts of nay-sayers and doomsday prophets.

(Reproduced with permission from Chemical Weekly, 29th March 2022)
Achieving Self-Reliance in Chemicals: What will it take?

Jasbir Singh, Industrial Advisor (Retired) Department of Chemicals & Petrochemicals

The chemicals and petrochemicals industries are an indispensable and integral part of modern life, touching almost all spheres of human activity. This industry plays a vital role in economic growth and development of the manufacturing sector. The chemical industry is also an important constituent of the growing Indian economy and contributes significantly to the GDP of the country. It is the mainstay of industrial and agricultural development of the country, providing several building blocks and raw materials for several industries, including textiles, paper, paints, soaps, detergents, pharmaceuticals, agrochemicals etc. The per capita consumption of chemicals in India is about one-tenth of the world average, indicating that much of the potential demand is yet to be realised.

Chemicals industry at a glance

As per IMF statistics, India’s present GDP in 2021 stands at US$2.94 trillion. The growth in GDP, as announced in the recent budget (February 2022), is expected to be of the order of about 9.2%, to reach a size of US$3.20 trillion. With further annual envisaged growth rate of 6.62%, India’s GDP will reach US$5 trillion by 2025, and our economy will be among the five largest world economies by 2025.

In our expected economy of US$5 trillion, the manufacturing and agriculture sectors shall contribute US$1 trillion each, while the contribution of services sector has been estimated to be at US$3 trillion. The global chemical market size was estimated at US$5.0 trillion in 2017. The Indian chemical industry accounts for about 3% of the world chemical market.

As per the European Chemical Industry Council Report 2021 (Cefic 2021), world chemicals sales in 2019 was valued at €3,669 bn. India ranks fourth in Asia and sixth in the world, with chemicals sales valued at €92 bn in 2019.

Trade in major chemicals and petrochemicals

Indian chemicals industry ranks 11th in the world export of chemicals and ranks 6th in the world import of chemicals. India’s share in world export and import of chemicals during 2019 was 2.91% and 3.67% respectively. India is a net exporter in pharma, man-made fibre, man-made filament, dyestuffs, and pesticides segments.

It may be seen from Table 1 that total imports of chemicals in the country are increasing year after year, widening the trade deficit. The import of organics/inorganics and plastics articles is higher, as compared to their exports, mainly due to non-availability of feedstock and building blocks. A number of petrochemical items, especially polymers, are being imported due to lack of sufficient production capacity, as well as to due to non-availability of natural resources like natural gas and crude oil.

Feedstock for chemicals & petrochemicals

Naphtha and natural gas are important feedstock for steam cracking for manufacturing basic inputs for the manufacture of petrochemicals. Naphtha is an important input for manufacturing olefin (ethylene, propylene, butadiene) and aromatics (benzene, toluene, xylene) components, whereas only olefin can be made by cracking of natural gas.

At present, in India there are 10 steam cracking complexes, which uses a wide variety of liquid feedstocks like naphtha, condensate, gas oil, natural gas liquids, etc. and there are three aromatic reforming units producing benzene, toluene, xylene etc. Few refineries are also separating benzene and toluene from their crude oil refinery operations. Many important petrochemicals like LDPE, LLDPE, HDPE, EDC, Polyols, Polypropylene, and Butadiene can be manufactured from the olefinic fraction of naphtha. The present naphtha cracking and dual (gas & naphtha) cracking capacity in the country is to the extent of 7.75 mtpa in terms of ethylene, which is inadequate to meet the growing demand of polymers and other petrochemicals in the country. HPCL- Mittal Energy Ltd. (HMEL) is in the process of installing a naphtha cracker with capacity 1.20 mtpa at Bhatinda, which is expected to be commissioned by end of 2022.

To meet the growing demand of chemicals & petrochemicals, India will need six additional crackers by 2030, and additional 10 by 2040. The approximate cost of a global scale cracker of capacity 1.5 mtpa is US$6 bn. Total investment needed for production of petrochemicals
requirement is approximately US$96-bn. Two new major projects are being implemented or are in the planning stages:

- Ratnagiri Refinery and Petrochemicals Ltd. (RRPCL), having crude refining capacity of 60-mtpa, which would be largest greenfield refinery-cum-petrochemical complex and expected to cost US$40-bn; and
- HPCL Rajasthan Refinery Ltd. (HRRL), as a joint venture between Hindustan Petroleum Corporation Ltd. (HPCL) and Government of Rajasthan (GoR) with an equity participation of 74% and 26% respectively. The company is setting up a greenfield 9-mtpa refinery-cum-petrochemical complex in Barmer district of Rajasthan.

With the implementation of these projects of HMEL, RRPCL & HRRL, the supply of feedstocks to make petrochemicals, especially polymers, shall ease.

### Need to consider domestic demand on the same footing as export demand

Despite de-licensing and de-contro1, the chemicals and petrochemicals sector has not been able to attract the desired level of investment. No industrial licensing is required for manufacturing of chemicals and petrochemicals except for three highly hazardous chemicals. Import of technology and 100% Foreign Direct Investment (FDI) is covered under the automatic route.

As per the Department for Promotion of Industry and Internal Trade (DPIIT), FDI inflow during 2018-19 and 2019-20 was US$1,981-mn and US$1,059-mn respectively. The cumulative FDI inflow into the chemicals sector from April 2000 to June 2020 is to the extent of US$17,775-mn, which calculates to 3.73% of the total FDI inflow.

The ‘Ease of Doing Business’ has improved substantially from the global rank of 77 in 2019 to the rank of 63 in 2020, indicating a regulatory environment conducive to business operations. However, even the notification of huge areas in four Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIRs), liberalized industrial/trade policy and environment of support and facilitation, have not proved to be adequate to bring sufficient new projects to meet domestic demand alone and resulted in dependence on import of various chemicals and petrochemicals.

Most global players in the sector recognise India as a great market for chemical and petrochemicals. But when it comes to setting up new production capacities, they find the neighbouring ASEAN countries more attractive than India due to lower factor costs, various incentives and hidden subsidies offered by those countries. Free access offered by India under many Free Trade Agreements (FTAs) with these countries, allows them to serve the Indian market by producing in these neighbouring countries at much cheaper cost. Consequently, the PCPIR regions have not able to attract sufficient foreign investments.

### Table 1: Trade in chemicals & petrochemicals

<table>
<thead>
<tr>
<th></th>
<th>Exports</th>
<th>Imports</th>
<th>Net imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-05</td>
<td>43,116</td>
<td>44,264</td>
<td>1,148</td>
</tr>
<tr>
<td>2005-06</td>
<td>50,869</td>
<td>56,188</td>
<td>5,319</td>
</tr>
<tr>
<td>2006-07</td>
<td>61,274</td>
<td>66,325</td>
<td>5,051</td>
</tr>
<tr>
<td>2007-08</td>
<td>65,773</td>
<td>76,374</td>
<td>10,601</td>
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<td>2008-09</td>
<td>78,104</td>
<td>1,01,898</td>
<td>23,794</td>
</tr>
<tr>
<td>2009-10</td>
<td>83,788</td>
<td>1,10,113</td>
<td>26,325</td>
</tr>
<tr>
<td>2010-11</td>
<td>1,02,207</td>
<td>1,38,731</td>
<td>36,524</td>
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<tr>
<td>2011-12</td>
<td>1,35,330</td>
<td>1,76,419</td>
<td>41,089</td>
</tr>
<tr>
<td>2012-13</td>
<td>1,50,829</td>
<td>2,09,909</td>
<td>59,080</td>
</tr>
<tr>
<td>2013-14</td>
<td>1,77,862</td>
<td>2,41,311</td>
<td>63,449</td>
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<td>2014-15</td>
<td>1,77,813</td>
<td>2,62,722</td>
<td>84,909</td>
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<td>2015-16</td>
<td>1,81,370</td>
<td>2,61,880</td>
<td>80,510</td>
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<td>2016-17</td>
<td>1,90,189</td>
<td>2,69,184</td>
<td>78,995</td>
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<td>2017-18</td>
<td>2,19,276</td>
<td>3,17,853</td>
<td>98,577</td>
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<td>2018-19</td>
<td>2,83,283</td>
<td>3,94,830</td>
<td>1,1,547</td>
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<tr>
<td>2019-20</td>
<td>2,74,950</td>
<td>3,59,650</td>
<td>84,700</td>
</tr>
<tr>
<td>2020-21</td>
<td>2,78,838</td>
<td>3,73,710</td>
<td>94,892</td>
</tr>
<tr>
<td>CAGR [2009-10 to 2020-21]</td>
<td>10%</td>
<td>11.75%</td>
<td></td>
</tr>
<tr>
<td>2021-22</td>
<td>3,06,721</td>
<td>4,17,620</td>
<td>1,1,0,899</td>
</tr>
<tr>
<td>2022-23</td>
<td>3,37,393</td>
<td>4,66,690</td>
<td>1,29,298</td>
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<tr>
<td>2023-24</td>
<td>3,71,132</td>
<td>5,21,527</td>
<td>1,50,395</td>
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<tr>
<td>2024-25</td>
<td>4,08,245</td>
<td>5,82,806</td>
<td>1,74,561</td>
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<tr>
<td>2025-26</td>
<td>4,49,069</td>
<td>6,51,285</td>
<td>2,02,216</td>
</tr>
</tbody>
</table>

Data up to 2020-21 are actual as per Department of Commerce site; data thereafter is estimated on past growth rates.
The need to incentivise production for export has been already recognised through the Special Economic Zone (SEZ) policy. For chemicals and petrochemicals, it is equally important to reduce import dependency because most of the chemicals support much larger downstream industries like pharmaceuticals, pesticides, dyes, automobiles, construction etc. If imports grow at the present rate, the future import bill will touch Rs. 6.51 lakh crores by 2025-26. If new investments are not supported, the future demand for chemicals will continue to be catered through huge imports. Hence it is urgently needed to facilitate and incentivise fresh investments in this sector not only for export promotion, but also for reducing imports to meet domestic demand.

Way forward

It may be seen from Table 1 that annual imports of chemicals are increasing year-by-year leading to trade gap in the sector. The National Policy on Petrochemicals, approved by the government in 2007, aims to promote the sector on sustainable basis and to increase the share in the international market. However, this has not happened despite the following initiatives, and the four PCPIRs approved by the Govt. are not able to fetch mega investments:

- The PCPIR Region policy 2007 was approved by Government to attract investments in this sector;
- Government has approved remission of Duties/Taxes on exported product, which is expected to improve cost competitiveness in the international market;
- The Dividend Distribution Tax has been abolished;
- Corporate tax rates in India are lower as compared to other many neighbouring countries; and
- 100% FDI in chemicals sector is permissible under the automatic route.

As mentioned earlier, SEZs provide a number of incentives for units in the SEZ geared to export in chemicals & petrochemicals. Import substitution, by augmenting domestic production capacity, is equally important and should be incentivised on the same lines of SEZ benefits, subject to finalisation of the modalities of the scheme by the Govt. for inclusion of a particular chemical in import substitution activity, requiring investment above threshold for setting up the mega project in the sector. Govt. must also provide world-class infrastructure in industrial estates, roads, ports, cheaper power and further improve ‘Ease of Doing Business’ in regulatory areas, etc.

There is need to introduce suitable tariff regime, as increasing imports would undermine Govt’s efforts towards self-reliance. The industry also needs to play pro-active role in this national goal of self-reliance and establish greenfield projects with world-class capacities and latest technologies to achieve competitiveness in the international market. The incentivisation of import substitution activity and other measures regarding improved infrastructure etc. can lead to self-reliance in the chemicals sector.

(Reproduced with permission from Chemical Weekly, 1st March 2022)
The 51st National Safety Day was observed on 4 March 2022 (extended for a week) throughout the country. The theme for this year National Safety Week was “Nurture Young Minds - Develop Safety Culture”. Chlor-alkali Industries observed Safety Day and Safety Week in their respective units to create awareness among their employees. A Report on Member Units Celebrations have been compiled and given below.

**Bodal Chemicals Limited Unit XII, Rajpura, Punjab**

*(Reported by Mr. U.K. Mehta, Manager - Safety & Fire)*

Bodal Chemicals Limited is committed to good safety practices. The Unit celebrated the 51st National Safety Week from 4th March to 10th March 2022 at Rajpura Plant.

Safety day opening function was attended by all the officers & workers and was presided by Mr. Rakesh Sharma, Sr. G.M. (Chemical). The Safety week celebration included various programmes related to safety awareness such as training programmes on chlorine and general safety, Children HSE poster competition, Chlorine Emergency competitive drill, Fire emergency drill, Safety quiz competition, Online quiz competition, First Aid Training programme, SHE slogan competition and Safety Exhibition.

Mr. Harjeet Singh Sandhu, Vice President (Works) inaugurated the programme of safety week celebration with hoisting the safety flag. Speaking on the occasion, Mr. Sandhu stated that we are celebrating the 51st National Safety Week & described how safety is important not only on the work but at the home also. He appealed to the all employees of the company to participate in ongoing activities of the safety week to make the motto of this National event, successful.

Speaking on the occasion, Mr. Adesh Kumar, Sr. Manager (Environment & Safety) stated that by implementing the safety measures in daily life how an individual can prevent injuries, prevent his family & society to be affected by the negative consequences of the accidents. He also described the detailed schedule of the activities of the safety week & appealed everyone to participate.
Nirma Ltd., Bhavnagar

(Reported by Mr. U.K. Mehta, Manager - Safety & Fire)

Nirma Ltd. celebrated the 51st National Safety Day 2022, which was aimed at renewing the commitment of all employees to working safely throughout the year. 320 persons attended the National Safety Day programme. Most of company employees and contractor workers participated in the programme. Chief Guest, Mr. S.D. Yadav, Officers of ISH Bhavnagar and Mr. A.B. Gorasiya, Officer Building & Construction Bhavnagar and Director, Mr. S.V. Sonara graced the function.

Mr. Viren V. Shah, AGM SHE welcomed the Chief Guest & other dignitaries, pinning the safety badges as well as hoisting safety flag. Safety banners and posters were displayed at various locations of the plant. Safety flag hoisting was done by Mr. D.G. Jakhade, Vice President. Safety and Swachhta oath administered by Mr. U.K. Mehta (Manager –SHE) and Mr. S.D. Yadav to all participants.

Mr. S. D. Yadav inaugurated the function and highlighted the importance of safety in his keynote address. He stated that safety is responsibility of everyone & takes care of workers training & development.

Mr. A.B. Gorasiya highlighted importance of observing safety day and week. Mr. S.V. Sonara highlighted the participation of contract workers in safety competitions and consequences of any mishaps for employees, their family members and society.

On this occasion Mr. Jakhade during his address emphasized on use of personal protective equipment (PPEs) and he stated Housekeeping and Safety Audit & Plant Inspection to be carried out at regular intervals. The Unsafe Condition can be eliminated through plant inspection at regular intervals and taking corrective action as and when required. He appealed for regular safety trainings for contract workers, employees and all involved in chlorine handling.

Safety awareness program like safety quiz, safety slogan, poem, essay writing, safety poster painting competition, good housekeeping contests were organized. Safety Badge lucky draw among all employees and contract workers was organized.

Mr. D.G. Jakhade awarded seven recognitions to the Best Safety Personnel in the plant besides trophy to outstanding housekeeping team.

The Chief Guest released a book by Nirma Ltd, on Life Saving Rules. Mr. S.V. Sonara inaugurated a Safety Exhibition. In this exhibition, various equipment for evaluation of health hazards, work environment equipment used in factory, various Personal Protective Equipment (PPEs), safety posters, different kinds of fire extinguishers and firefighting equipment were displayed.

Mr. S.M. Rohadiya (Dy. Manager-SHE) proposed a Vote of Thanks.

Punjab Alkalies & Chemicals Ltd., Naya Nangal

(Reported by Mr. M.P.S. Walia, GM Works)

Punjab Alkalies & Chemicals Ltd., Naya Nangal observed National Safety Day on 04.03.2022 and Safety Week from 04.03.2022 to 10.03.2022. Safety Day programme was inaugurated by Mr. M.P.S. Walia, GM(Works). He highlighted the importance of National Safety Day and emphasized to follow safe practices at work place and appealed to reduce lost time injuries to zero.

Various activities including competitions on safety slogan and poster were organised. Later winning safety slogans and posters were displayed. Training Programme on various topics related to construction safety, fire safety, health safety, electrical safety, environment safety, safety in handling hazardous chemicals & road safety were also organised.
A Tanker filled with 29kl of Hydrochloric Acid overturned in the Pallu Town in Hanumangarh District of Rajasthan

Hari Saran Das, Honorary SHE Advisor AMAI

INCIDENT

A tanker filled with 29 ¬¬KL of Hydrochloric was being transported from Nagda Junction, Ujjain in MP to Hanumangarh in Rajasthan. The above Hydrochloric Acid (HCl) tanker/ Truck overturned near the main Bus stand of Pallu town in Hanumangarh District of Rajasthan. The accident happened at 12 midnight on Tuesday, the 22nd December 2020. However there was no loss of life due to this accident,

Because of the acid fumes, it became difficult for people of the area to breathe. Persons in the town had difficulty in breathing and their eyes started burning. Shopkeeper Pawan Swami told that there was difficulty in breathing and there was panic among the shopkeepers of the locality.

Carts and kiosks of Street vendors stationed on the highway where the acid-filled tanker overturned were damaged. Five street vendor carts were affected after being hit by the overturned tanker. A Matka shop at the accident site was badly damaged.

Kamal Joshi, Mangilal and Ganesh Singh Bhati the employees of Jai Ambe Hotel located near Pallu Bus Stand reached the accident site after hearing a loud sound and noticed that the tanker was overturned and nothing was visible in the area. They informed the police about the incident.

After getting the incident information police reached the incident site.

The tanker driver Mr Nirmal Chawla was injured due to overturning of the tanker and was trapped inside the vehicle. Police persons covered their face with cloth and entered the accident site and rescued the driver from the truck and were sent to nearby hospital in an ambulance for treatment.

After sending the injured to the hospital, SHO, Amar Singh reached the spot again with the team and broke the glass of the tanker amidst the heavy acid fumes to verify if any other person is trapped inside the truck. After inspection, he confirmed that no other person was trapped inside the overturned tanker/truck.

Meanwhile, the condition of the police personnel worsened due to inhaling acid vapour and started vomiting. These affected police men were taken to the hospital for consultation with the doctor and treatment.

Thanaprabhari(SHO), Amar Singh, Head Constable Shiv Bhagwan, Mukesh Meena, Ramesh Godara, Subhash Khichar, Vikram, Ajay Meena, Indraj, Ramnivas, Kanhaiyalal, Ashok guided the vehicles passing on the highway to safety and prevented persons entering the accident site.

The tanker owner was asked to report at the accident site, the driver was interrogated, CCTV footage was also scanned to investigate the cause of the accident.
ROOT CAUSE

The tanker was on high speed due to which it overturned while negotiating the curve on the highway. The accident site is having a dangerous curve on the highway and many more accidents happened earlier also. Even after many accidents happened at the dangerous curve on the highway, no corrective action was taken to prevent accidents.

Second reason being that the street vendors keep their belongings/carts near that curved bend on the highway which also enhances the cause of the accidents.

RECOMMENDATIONS

1. Road condition on the route of the journey of the road tanker transporting hazardous chemicals like Hydrochloric Acid should be ascertained in advance by the transporter and should instruct the driver properly or may find alternate safe route for transportation.

2. Drivers transporting hazardous chemical should undergo 3 days special training conducted by any recognised institute and the same should be endorsed in the driving license of the driver.

3. The driver should possess appropriate driving license.

4. Drivers should be trained on safe driving.

5. Drivers should follow the speed limit and do not resort to rash driving.

6. Driver should follow the road signs/traffic signals and adhere to the instructions.

7. Driver should drive vehicle carefully while negotiating any bend or sharp curve on the road.

8. Water should be sprayed on the leaked Hydrochloric Acid acid to diffuse acid vapours.

9. The leaked Hydrochloric Acid may be neutralised with lime and wash with water. The wash water should not enter into any public sewer.

10. The acid contaminated soil should be excavated and stored in polythene bags for disposal in hazardous waste disposal site.

11. People should be advised to remain indoors and cover the face with wet clothes.

12. Tanker should carry first aid box and gas max.

13. Driver should carry TREMCARD.

14. Driver should inform the accident to the nearest police station and supplier.

15. Police is not equipped to handle such accidents. They can assist in traffic control and arrange medical aid.

16. Police should inform the nearest fire station for providing assistance.

17. District collector is the district emergency officer. Police should notify the district emergency control room for immediate assistance.

Source of the news: Dainik Bhaskar
Created for those in search of perfection...!
Jal Jeevan Mission: No drinking water shortage in 89 panchayats

The New Indian Express / 23 March 2022

Marking World Water Day, special grama sabha meetings were held in 89 panchayats of Tiruchy, Ariyalur, and Perambalur districts on Tuesday.

During the meetings, authorities declared that drinking water has been provided to all households in the panchayats through individual tap connections. This project has been implemented in 51 panchayats in Tiruchy, 18 in Ariyalur, and 20 in Perambalur.

Panaiyakurichi panchayat chief Renguadevi Parthasarathy told TNIE, “We have provided 110 individual household tap connections under Jal Jeevan Mission (JJM) for Rs 12 lakh. Through this we supply water from 6 to 9.30 in the morning and between 4 and 6.30 in the evening. Hence, there is no water shortage here. We are going to provide water under the scheme to other families in the village. Work is under way and will be completed soon.”

A resident of Panaiyakurichi, D Lenina Marry, said, “There was a shortage of water here before the panchayat president came. Now we get regular supply.”

Ariyalur Collector P Ramana Saraswathi inaugurated the sample drinking water testing set up on the Collectorate premises to mark World Water Day. He said, “Individual household tap connections were provided in 18 panchayats, including Andimadam, Thirumanur, Jayankondam, Sendurai, and T Palur. The public should realise the need for water and how to use it properly. People should implement rainwater harvesting system in their houses and buildings to save water during monsoon.”

Perambalur Collector P Sri Venkata Priya, who attended the special grama sabha meeting at Vadaku Madavi panchayat, said, “Drinking water connection has been provided to 1,045 households in Vadaku Madhavi panchayat. We need water throughout the year. But Perambalur receives water for three months due to the monsoon. There will be no rain for the remaining months. We can all take care of our daily work only if we have access to safe drinking water.

Therefore, we must protect the natural resources available to us.”

V Gopal, a resident of Vadaku Madhavi, said, “We need more water as it is summer now. We welcome this scheme as many people suffering from a lack of water will benefit from it. The authorities should provide adequate water to people without reducing the time of water supply.”


Let’s reaffirm our pledge to save every drop of water: PM Modi on World Water Day

The Economic Times | 22 March 2022

Prime Minister Narendra Modi on Tuesday reiterated drop of water on World Water Day and said it is conversation become a mass movement over the appreciated all individuals and organisations who “On World Water Day, let’s reaffirm our pledge to nation is undertaking numerous measures like Jal Jeevan Mission and access to clean drinking in a tweet. He added, “Over the last few years, it is heartening to become a mass movement, with innovative efforts taking place in all parts of the nation those individuals and organisations who are working towards saving water.”


Rs 753-crore Jal Jeevan project to provide taps to all houses in Kadapa

The New Indian Express | 21 March 2022

Under the Jal Jeevan Mission, 6,649 works will be taken up with an outlay of Rs 753 crore to provide tap connections to all households in the district. The scheme envisaged to solve the drinking water problem in villages on a permanent basis, will also cover Jagananna Colonies.

The Centre and the State government will bear the
total project cost equally. The project is expected to be completed by March 2023. A total of 314 works will be executed at a cost of Rs 150.29 crore in the first phase. In the second phase, 427 works will be taken up at a cost of Rs 31.36 crore to provide tap connections to Jagananna Colonies.

The project will cover all the nine Assembly constituencies in the district and the Kadapa Municipal Corporation. A sum of Rs 373.82 crore will be spent for carrying out retrofitting works of drinking water pipelines and new pipelines will be laid at a cost of Rs 197.43 crore. Funds have been allocated for all the nine Assembly constituencies for the execution of water project.

The Jal Jeevan Mission envisages supply of 55 litres of water per person per day to every household. Kadapa Rural Water Supply in-charge SE MC Veeranna said, “The Jal Jeevan Mission works will solve the drinking water problem in rural areas of the district on a permanent basis.”

HCC, OMIL bag Rs 609 crore-contract for water supply project in Rajasthan

The statement said the project will be funded under the central government’s Jal Jeevan Mission with contributions from the various state governments.

Jal Jeevan Mission barely floats in Uttara Kannada

The Jal Jeevan Mission, an initiative of the Union government to provide clean drinking water to rural areas, has become a burden for the administration as well as villagers of Uttara Kannata district and the project has been put on hold in over 60 villages.

Drawing water lines to remote, forested rural parts of the district is difficult as houses are situated far from each other, resulting in cost escalation. The district is densely populated along the coast, but in the Western Ghats, houses have a minimum of at least 1 km distance between them.

"Considering the geography of the region, we need to invest heavily on long pipelines. With the rise in petroleum product prices, the cost of PVC pipes too has gone up," said an officer associated with the project.

Another officer said that the administration cannot make such heavy investments. “We tried to get people to invest part of the cost, but since they need to put in thousands of rupees, they are hesitant,” he added.

Re-strategising project, says zilla panchayat CEO

In addition, the project comes with the condition that the water supplied should only be surface water and borewell water is permitted only in cases where surface water is not available. “We tried to dig borewells. But as the water level is deep, it was becoming prohibitively expensive and unfeasible,” said the officer.

The project has hit the wall in hilly parts of Joida, Kumta, Siddapur and other taluks. M Priyanga, Chief Executive Officer, Uttara Kannada Zilla Panchayat, agreed that the cost of the project is high in these regions. “I have spoken to the chief engineer and we are now planning to re-strategise..."
The project. I personally visited all the taluks where the implementation has taken a backseat.

The new strategy will reduce the price by about 30 per cent by redesigning overhead tanks," she said. In the first phase, around 45,000 houses were connected in 2020-21 another 45,000 houses will be connected 2021-22 and 80,000 houses in 2022-23, she added.


Peddireddy urges Centre to sanction Rs 3,720 crore under Jal Jeevan Mission

The New Indian Express | 06 March 2022

Informing that Rs 8,690 crore is required for taking up the Jal Jeevan Mission works in six districts of Andhra Pradesh, Panchayat Raj and Rural Development Minister Peddireddy Ramachandra Reddy said even after exempting the 15th Finance Commission funds and Urban component, Rs 7,440 crore is required for taking up the works.

He urged the Union Jal Shakti Minister Gajendra Singh Shekhawat to sanction Rs 3,720 crore as the share of the Centre and that the state will bear the remaining cost. He said that the funds are required because of aquaculture in twin Godavari and Krishna districts and because of fluoride and water scarcity areas in Guntur, Prakasam and Chittoor districts.

Participating in the Jal Jeevan Mission regional conference presided by the Jal Shakti Minister in Bangalore on Saturday, Peddireddy said that the AP government was taking measures to provide functional household tap connections (FHTCs) to all the residences in the state by 2024.

He said that out of the total 95.16 lakh houses, FHTCs were provided to 50.26 lakh houses. The government is planning to give connections to the remaining 44.90 lakh houses by 2024. He appealed to the Union Minister to sanction funds to AP in 90:10 ratio for Jal Jeevan Mission works on the lines of North East states because of precarious finances of the state. He said the Chief Minister had already written letters to Prime Minister Narendra Modi and Jal Shakti Minister to this effect.

Tap water connection to all houses by 2024

The Minister said that out of the total 95.16 lakh houses, FHTCs were provided to 50.26 lakh (52.81%). The government is planning to give connections to the remaining 44.90 lakh houses by 2024. AP government was taking measures to provide tap connections to all the residences.


‘Inter-State Water Disputes Act’ needs to be totally amended: Karnataka CM Basavaraj Bommai

The Economic Times | 05 March 2022

Karnataka Chief Minister Basavaraj Bommai on Saturday said the ‘Inter State Water Disputes Act’ needs to be totally amended, as it creates more disputes than resolving them.

He was addressing the southern states’ conclave on the ‘Jal Jeevan Mission’ and ‘Swachh Bharat Mission’ (Rural) Projects here.

“Our Inter-State Water Disputes Act needs to be totally amended. The name itself says interstate water disputes act. It creates more disputes than solving disputes. We need correction in our law so that more water is available for different sections of people, instead of narrow political considerations,” Bommai said.

He claimed that river basin management is the only answer for that. Stressing on the need for high quality efficiency in irrigation, the CM said there is misutilisation of a lot of water in irrigation. He said, “our canal carrying capacity at the national level is not more than 45 per cent, so there is a gap of almost 55 per cent in our canal carrying capacity. Once we improve all these things a lot of water will be available.”

Mission projects in Karnataka, Bommai said, of the 97.91 lakh rural households, tapped water has to be provided for 25 lakh households in the initial phase, while the achievement has been about 18 lakh, and the target of 25 lakh would be met within the next few months. “.... more funds have been provided in the budget for implementing the project. I am personally overseeing the project to see to it that it will be completed in time,” he said, adding that...
Ready to facilitate talks between Karnataka, Tamil Nadu on Mekedatu: Union Jal Shakti Minister

The Economic Times | 05 March 2022

Union Jal Shakti Minister Gajendra Singh Shekhawat on Saturday said the Centre is ready to facilitate talks between Karnataka and Tamil Nadu on the Mekedatu project across the Cauvery river. The minister was in the city for the southern states’ conclave on the ‘Jal Jeevan Mission’ and ‘Swachh Bharat Mission’ (Rural) Projects. “We are in the process of doing that…I can’t assure you how long it will take as consensus has to be built,” Shekhawat said in response to a question whether “By sitting together, any sort of problem can be addressed. I wish all stakeholder states can sit together and address the issue so that this year onward the new Mekedatu project can see the light of day,” he said. Citing Uttar Pradesh and Madhya Pradesh as an example for resolving water disputes through talks, the minister said both states have agreed on providing water to the fields of water-parched Bundelkhand area and linkage of the KenBetwa river.

Hoping that the Mekedatu project is implemented, he did not want to talk much on the matter, as it is sub-judice. Expressing his government’s commitment to the Mekedatu project by getting required clearances from the appropriate authority of central government, Karnataka Chief Minister Basavaraj Bommai in the budget presented by him on Friday, has provided a grant of Rs 1,000 crore in the current year for The Mekedatu multi-purpose (drinking and power) project involves building a balancing reservoir near Kanakapura in Ramanagara district. Neighboring Tamil Nadu is opposed to the project, while Karnataka awaits central clearances. The estimated Rs 9,000 crore project once completed is aimed at ensuring drinking water to Bengaluru and neighbouring areas (4.75 TMC) and it can also generate 400 MW power. Karnataka has maintained that the project within its territory will benefit both states as the surplus water stored can be managed between the two during a distress year, and its implementation will in no way affect the interests of Tamil Nadu’s farming communities, as there will be no impact on its share of water. However, the neighbouring state is of the view that the project would “impound and divert” the uncontrolled water flow due to Tamil Nadu from Kabini sub-basin, the catchment area below Krishnarajasagara, and also from Simsha, Arkavathy and Suvarnavathi sub-basins besides other small streams. Congress in Karnataka had recently held a ‘padayatra’ (foot march), demanding implementation of the Mekedatu project at the earliest, stating that it is a drinking water project with no legal hurdles. Blaming Congress for inter-state water disputes, Shekhawat said they have no moral right to question the BJP, which can only resolve such issues, including Mekedatu. However, he pointed out that water is a state subject and states have to come together and solve issues. “….technically, we can and are ready to facilitate states by making them sit together.”

Hot Work is more than Welding, Burning & Grinding

On September 21, 2020, a fire (Fig. 2) was ignited in a bucket of flammable resin being used to reline a Fiberglass Reinforced Plastic (FRP) tower at a papermill. Smoke and fumes from the fire killed two contractors. There are many lessons to be learned from this event. This Beacon will focus on the uncontrolled Hot Work aspect of the incident.

The plant was shut down for a turnaround, including internal repairs to the Upflow and Downflow bleaching columns (Fig. 3).

The repairs to these were managed under two Confined Space Entry (CSE) Permits. Hot Work was not planned, nor authorized for either job. There were no flammable materials in the towers, though the FRP walls in the Upflow Tower were combustible.

On the day of the fire, the crew working in the Upflow Tower (left) were having difficulty getting their resin to cure properly, due to cool temperatures. When they found no drum heaters for the drum outside the tower, they decided to use a heat gun (Fig. 1) for the bucket at their working place (marked red).

The heat gun was accidentally dropped into a resin bucket, igniting the flammable contents. The crew didn’t have a fire extinguisher, and the fire spread – eventually igniting the FRP walls. Two contractors working in the connected Downflow Tower (right; marked green) were overcome by the gases before they could escape.

Reference & Figures
https://www.csb.gov/assets/1/20/evergreen_investigation_report_final.pdf?16709
Dimensionally Stable Anodes and Cathodes (Titanium, Nickel & Steel)

- Ruthenium - Iridium based
- Mixed Metal Oxide based
- Platinum - Iridium based
- Platinized Ti / Nb based
- Palladium based
- Iridium based

* Electrolytic Production of Chlorine * Chlorate * Hypochlorite * Hydrogen & Oxygen * Electro dialysis * Electroforming * Electro winning * Electro plating
* Electro galvanising * Electrolytic recovery * Regeneration of chromic acid
* Electro synthesis of Organic and Inorganic Compounds.

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NEWS DIGEST

General

Biden proposes more assistance to India in clean energy, digital economy

Business Standard | 30 March 2022

US President Joe Biden has proposed to increase the developmental assistance to India in clean energy, digital economy, and also in combating increasing authoritarianism.

The proposed increase in India’s developmental assistance from USD 25 million in 2021 to USD 66 million for the fiscal 2023 is part of the State Department’s developmental assistance for the fiscal 2023, which was sent by the White House to the US Congress.

The funding increase for India supports India’s role as a regional leader by increasing clean energy and other climate programming. Funds will also advance investments in the digital economy, said the State Department’s portion of the budget.

Assistance will combat increasing authoritarianism, bolster human rights and strengthen civil society participation and democratic governance, the State Department said.

The Biden Administration has also proposed to increase aid to India on the health sector from USD 34.5 million in 2021 to 48.5 million in 2023.

IIT-Kanpur researchers develop technique for wastewater treatment

Chemical Weekly | 29 March 2022

Researchers from the Department of Mechanical Engineering at Indian Institute of Technology, Kanpur (IIT-K) have invented a novel nano-adsorbent for wastewater treatment.

The uniform cubical nano-adsorbent, developed by researchers Dr. Archana Raichur and Dr. Niraj Sinha, is eco-friendly, reusable, bactericidal and multi-layered and will help in the selective removal of harmful bacteria from water.

The nano-adsorbents have unique physio-chemical properties that can deactivate and separate antibiotic-resistant bacteria (ARBs) from water. They have potential for use as a component of membrane filters and for bio-remediation.

India, UAE trade pact may come into force from May 1: Union Minister Goyal

Business Standard | 28 March 2022

The free trade agreement between India and the UAE is likely to come into effect from May 1 this year, under which domestic exporters of as many as 6,090 goods from sectors like textiles, agriculture, dry fruits, gem and jewellery would get duty-free access to the UAE market, Commerce and Industry Minister Piyush Goyal said.

The Comprehensive Economic Partnership Agreement (CEPA) was signed by India and the United Arab Emirates (UAE) in February which aims to boost bilateral trade to USD 100 billion in the next five years from current USD 60 billion.

The minister said that the detailed text of the pact has been released in public domain and now we are trying to complete all our paperwork, all the customs notifications expeditiously.

We hope it can be operationalised by May 1, 2022.

Overall, the UAE is offering duty elimination on over 97 per cent of its products which account for 99 per cent of Indian exports here in value terms.

«Currently, we are exporting about USD 26 billion worth of goods to the UAE, almost 90 per cent of them will get total tariff (or customs duty) elimination on Day 1 itself. Going forward in the next 5-7 or ten years, the rest of the 9.5 per cent (about 1,270 goods) will also get zero duty,» Goyal said at the Dubai Expo here.

Explaining the importance of the pact, he said the UAE also opened doors for the rest of the Middle East, some parts of Africa and Europe.

India will be giving duty-free access to 7,694 goods on the day of implementation of the agreement. Around 2,400 goods would get zero duty in 5-10 years time period.

As part of protective measures in the pact, there are stringent rules of origin criteria that reflect the requirement for substantial processing of up to 40 per cent for most of the products and wholly obtained criteria for agricultural products.

When asked about free trade agreement with the Gulf Cooperation Council (GCC), Goyal said: we are at an advanced stage of discussion on the scope of the agreement. I believe that discussions will get over in the next 15-20 days.

After that, he said, we hope to launch formal negotiations for a broad based FTA with all the GCC nations and that will open up the entire Middle East market for Indian goods and services.
Gujarat again tops NITI Aayog’s Export Preparedness Index 2021

The Print | 25 March 2022

Gujarat, for the second consecutive year, has topped the Niti Aayog’s Export Preparedness Index 2021 which is aimed at assessing the readiness of the states in terms of their export potential and performance.

Gujarat was followed by Maharashtra, Karnataka, Tamil Nadu, Haryana, Uttar Pradesh, Madhya Pradesh, Punjab, Andhra Pradesh and Telengana, according to the government think tank’s report.

Union territories and states like Lakshadweep, Arunachal Pradesh, Mizoram, Ladakh and Meghalaya were placed at the bottom.

The index, prepared in partnership with the Institute of Competitiveness, can be used by states and Union Territories (UTs) to benchmark their performance against their peers and analyse potential challenges to develop better policy mechanisms to foster export-led growth at the sub-national level.

The ranking is based on four main pillars: policy, business ecosystem, export ecosystem and export performance, and 11 sub-pillars like export promotion policy and business environment.

The index’s primary goal is to instil competition among all states (coastal, landlocked, himalayan and UTs/city-states) to bring about favourable policies, ease the regulatory framework, create necessary infrastructure and assist in identifying strategic recommendations for improving export competitiveness.

Releasing the report, NITI Aayog Vice Chairman Rajiv Kumar said growth of India’s exports is 36 per cent, while the world trade growth is 30 per cent.

Commerce Secretary BVR Subrahmanynam said that exports have done “extremely” well and crossed USD 400 billion-target ahead of schedule despite issues like shortage of containers, shipping freights, shortage of chips and semiconductors.

“About 18 per cent of the economy is merchandise exports …I think we should be aiming at something like 25 per cent of the GDP to be actually traded,” he said, adding, the Department for Promotion of Industry and Internal Trade (DPIIT) comes out with ODOP (One District One Product) programme which has actually created a buzz all around and “we have actually built on that to have district export hub initiative which we are trying to convert into a scheme”.

“We will soon be launching a portal which will have export data — country and commodity wise… It will also provide a real time data of exports from states and possibly from districts. I think we should get it going in April,” Subrahmanynam said.

He added that there are gaps in data right now. Citing an example, he said currently a lot of export is credited to Kandla or Nhava Sheva or Kakinada, but those goods may be originating elsewhere.

“We are trying to improve that… so that it also tells us the source, so that we can actually trace the export back… we will be coming with that in a month or two,” he added.

NITI Aayog CEO Amitabh Kant emphasised that the second edition of the index will be a significant catalyst for promoting competitive federalism and a fair contest among states and UTs in the global export landscape.

Around 70 per cent of exports have been dominated by five states — Maharashtra, Gujarat, Karnataka, Tamil Nadu and Telangana, he added.

India lost 29% of solar power potential due pollution: IIT-D study

Chemical Weekly | 29 March 2022

Air pollution is not just taking a toll on health, but also holding India back from achieving its solar energy goals, says a study carried out by Indian Institute of Technology, Delhi (IIT-D).

The study says the country lost 29% of its utilisable ‘global horizontal irradiance potential’ due to air pollution between 2001 and 2018, equivalent to an annual loss of $245-835 million.

IIT-D researchers considered both the ‘soiling effect’, or presence of solid dust, and ‘atmospheric attenuation’, or the scattering of light due to gaseous pollutants in the air, to assess pollution. The study asserts that India could have generated more clean energy and relied less on fossil fuels for power had it met its clean air targets. As it is, the study says, urban haze caused an 11.5% loss in solar radiation falling on a surface in Delhi during 2016-17, causing a loss of about $20-mn.

“Successful implementation of the National Clean Air Programme (NCAP) and complete mitigation of household emissions through the supply of cleaner fuel for domestic use and rural electrification would allow India to generate a surplus electricity of 6-16 TWh (terawatt hour) per year from the existing solar power installed capacity in 2018. This translates to an economic benefit of $325-845 million annually,” says the study entitled ‘Cleaner air would enhance India’s annual solar energy production by 6-28 TWh’ written by Dr. Sagnik Dey, Dilip Ganguly, Somnath Baidya Roy and others from the Centre for Atmospheric Science, IIT-D.

The study urges the “successful implementation” of three government programmes: Pradhan Mantri Ujjwala Yojana (PMUY) and Deen Dayal Upadhyay Grameen Jyoti Yojana (DDUGJY) for reducing household emission, and NCAP to tackle ambient air pollution. It asserts that PMUY and DDUGJY can generate a surplus of 3-8 TWh per year, worth $163-425 million, while meeting the NCAP target would generate another 3-8 TWh per year.

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The study pointed out that the combined benefits from these three policies were worth $325-845 million, or almost the equivalent of the budget allocation of $1,100 million for PMUY and $42.6 million for the first two years of NCAP.

It also estimates the potential benefits of India meeting WHO’s guidelines on clean air of 10 micrograms of particulate matter per cubic metres, at a surplus of 10-28 TWh per year, resulting in incremental revenue of $505-1,425 million annually. The study also said that generation of this surplus energy would be more pronounced in the eastern and north-eastern power grids because the population in those regions relied extensively on fossil fuel and biomass burning for day-to-day activities.

India, UK conclude second round of FTA talks; to meet next in April

Live Mint | 26 March 2022

India and the UK concluded the second round of talks for a proposed bilateral Free Trade Agreement (FTA) in London last week and exchanged notes on the trade concessions both sides were looking at, the government said.

The two sides are expected to meet again in April in Delhi for the third round of talks to explore the possibility of signing an early-harvest deal.

A section of the Indian delegation leading the discussions was housed in a dedicated UK negotiation facility, while others attended the meet virtually, the ministry of commerce and industry said. Technical experts from both countries attended 64 sessions covering 26 policy areas, it added.

The negotiations are significant considering that the UK is India’s seventh-largest export market. It accounted for 2.8% of shipments as of June 2021. While India had a $3.3 billion trade surplus in 2020-21 it has been losing market share for key products to other developing countries following the withdrawal of the Generalized System of Preferences by the UK administration.

Recently, both countries committed to more than double the UK-India trade value by 2030.

During the second round of talks, New Delhi sought duty concession for labour-intensive exports, such as textiles, besides easy market access for Indian fisheries, pharma and agricultural products. In a recent report, UK think-tank Resolution Foundation said British firms will benefit from the “first mover” advantage ahead of the European Union and the US if it concludes the FTA with India.

In February, India concluded a comprehensive economic partnership agreement with the UAE, the first bilateral trade deal signed by the Narendra Modi administration since it came to power in 2014. India is also negotiating early-harvest agreements or mini FTAs with Australia and Canada.

Meanwhile, commerce and industry minister Piyush Goyal told the Parliament that the Centre was taking steps to protect India Inc. from the fallout of Ukraine war, Western sanctions on Russia, and the surge in global commodity prices. “Various measures are being taken to ensure payments (to exporters) come on time. In terms of facilitation for importers and exporters, the government is in dialogue with all who are impacted by the Ukraine crisis,” said Goyal.

India attains $400bn exports mark, but trade deficit remains a concern

Business Line | 24 March 2022

Led by a sharp jump in exports of engineering and electronic goods, India’s merchandise exports grew 37% over the previous year to surpass the $400 billion mark for the first time within a financial year, union commerce and industry Minister Piyush Goyal said.

Goyal said that the export target of $400 billion was met nine days in advance and was significantly higher than the previous high of $330 billion came during 2018-19. He added that it is an important milestone for Atmanirbhar Bharat and that the target was achieved by breaking every silo between the government and the industry. He added that states have started playing an important role in boosting exports.

According to government data, India’s merchandise imports jumped to a record $589 billion owing to the rising oil prices, while exports till March 21 stood at $400.8 billion.

Economists, however, cautioned that rising economic uncertainty from the Russia-Ukraine conflict could worsen the trade deficit and widen the current account deficit going forward as international oil prices are likely to remain elevated, while supply-side bottlenecks and rising freight costs could hurt exports.

“Engineering goods exports nearly jumped 50% over last year, electronic goods also jumped 41% last year. A huge jump was seen in the agricultural exports and non-basmati rice, wheat and marine products led the growth,” Santosh Kumar Sarangi, Director General of Foreign Trade (DGFT) said during the press conference.

An official who did not want to be named said that in some areas commodity prices hike has played a role but there is evidence that exports have risen despite stable prices and in some cases despite a decline in prices.

The official said that export items that showed a rise in volumes but not in value included agricultural commodities such as rice and motor vehicles.

“High commodity prices are embedded in export numbers and this has magnified the export figures,” ICRA Chief Economist Aditi Nayar said, adding that the base effect is very high. She further said that exports could rise by a 5% rise in FY23 over FY22.
Goyal said that the meeting of the export target was a result of detailed strategy as the Department of Commerce disaggregated the $400 billion target in terms of regions and countries as well as commodity groups.

Former chief statistician Pronab Sen said that India could see exports rising in the coming months and much will depend on the value of the rupee. If the depreciation of the rupee continues the exporters will benefit and foreign portfolio investors could move their money elsewhere as Fed rates have already started rising.

**World Economy will grow 3.5% in 2022: FITCH**

*The Asian Age | 23 March 2022*

Rating agency Fitch has cut its world GDP growth forecast for 2022 by 0.7 per cent to 3.5 per cent as inflation challenges intensify and Russia’s invasion of Ukraine threatens global energy supplies.

This reflects the drag from higher energy prices but also a faster pace of US interest rate hikes than previously anticipated, a special report by Fitch said.

Fitch has revised down world growth for 2023 by 0.2 per cent to 2.8 per cent. Brent crude oil futures traded at $114.75 per barrel on Tuesday after hitting $130 per barrel in early March. Fitch has also lowered India’s growth forecast for FY 2022-2023 by 1.8 per cent to 8.5 per cent on sharply higher energy prices and sees inflation strengthening further.

**Enabling exports as key growth driver**

*Business Line | 20 March 2022*

The Economic Survey 2021-22 projected a GDP growth of 8.0-8.5 per cent in 2022-23, with exports playing a crucial role. India’s exports rebounded strongly and surpassed pre-Covid levels during 2021-22. The merchandise exports touched all-time high to $375 billion during 2021-22 (April-February) — more than yearly exports ever registered so far.

However, the recent Russia-Ukraine crisis has stoked uncertainty in global trade with rising crude oil prices and disruptions in global supply chains due to Western sanctions. While India does not have a significant merchandise trade with Russia or Ukraine, nevertheless, exports of pharmaceuticals, telecom instruments, tea, coffee, marine products, etc are likely to be hit.

But India now has an opportunity to increase its wheat exports, as there are disruptions of exports from both Ukraine and Russia — which together account for more than 25 per cent share in global wheat trade. The impact on Indian exports depend upon the length and duration of the crisis, however, it is expected to be a short-term aberration given that both nations are engaged in talks.

The Budget 2022-23 has emphasised the long-term potential for Indian exports. It has set its priorities right — with emphasis on infrastructure development, building capacities in sunrise sectors and continued support to R&D — to support exports. While the rationalisation of customs duties and tariff simplification would boost exports in the short term, the infra and institutional push envisioned in the Budget would go a long way in generating positive externalities for the export ecosystem in the medium to long-term.

The calibration of customs duty to promote domestic manufacturing of electronic goods would enhance electronic exports. Further, the reduction in customs duties on diamonds and gemstones and chemicals would lower input costs and make their exports more price-competitive.

This acquires added relevance as gems and jewellery, chemicals and electronic goods are among the leading export commodities. In order to incentivise labour-intensive exports, exemptions are being provided on items used by bonafide exporters of handicrafts, textiles and leather garments and footwear.

An efficient and competitive logistics ecosystem is crucial to boost exports. While India has made substantial progress in trade-related logistics, yet the logistics cost in India (14 per cent of GDP) is higher than that of developed countries (8-10 per cent of GDP) (LEADS 2021 Report), — putting Indian exports at a disadvantage.

The Budget has placed considerable emphasis on the PM Gati Shakti National Master Plan that would build world-class infrastructure. This would facilitate seamless multimodal connectivity and logistics efficiency thereby reducing the logistics cost and time significantly.

Further, the Budget has increased capital expenditure by 35 per cent to crowd-in private investment, to enable virtuous cycle of investment for developing integrated infrastructure. All these put together would enhance the competitiveness of India’s exports manifold.

Given the fact that only eight products constitute more than 55 per cent of total exports, there is a critical need for product diversification in India. In this regard, the support to sunrise sectors such as Artificial Intelligence, Geospatial Systems and Drones, Semiconductor and its eco-system, Space Economy, Genomics and Pharmaceuticals, Green Energy, and Clean Mobility Systems through facilitative policies and incentives for R&D assumes significance to diversify the export basket.

Further, the concept of ‘One Station-One Product’ would feed in the initiative of developing ‘Districts as Exports Hub’ and would support the government efforts in diversifying the product basket of Indian exports. This would also help the local MSMEs to be part of the supply chain.

Among other budgetary announcements, the additional allocation of ₹50,000 crore and extension of Emergency Credit Linked Guarantee Scheme (ECLLGS) up to March 2023.
and infusion of funds into Credit Guarantee Trust for Micro and Small Enterprises (CGTMSE) scheme would benefit the MSME sector.

The focus on digitisation in the Budget is well placed as the WTO study (February 2021) shows that the global trade growth is estimated to be 2 per cent higher annually, due to adoption of digital technologies by 2030. India by being the largest software exporting country (WTO report 2021), is expected to gain with increased “servicification”.

The emphasis on Ease of Doing Business 2.0 and Ease of Living, through active involvement of States, digitisation of manual processes, bringing in standardisation and removal of overlapping compliances, would lessen the compliance cost and enhance the ease of exporting.

In particular, to make States partners in export promotion, it is proposed to replace the Special Economic Zones Act, with reforms suggested in customs administration of SEZs to make it fully IT driven, more facilitative and only risk-based checks, thereby improving ease of doing business by SEZ units considerably.

Overall, Budget 2022-23 has stayed true to the long-term goal of complementing macro-growth, enabling exports as a key driver through increased competitiveness and diversification. This would allow India to position itself at the central stage in global value chains in post-COVID world.

**Indian economy faces downside risks from Russia-Ukraine war: RBI**

*Financial Express | 18 March 2022*

The ongoing geopolitical crisis has heightened the uncertainty in the global macroeconomic and financial landscape, even as the world economy struggles to recover from the pandemic, the Reserve Bank of India (RBI) said in its State of the Economy report, published as part of its March bulletin. The Indian economy is experiencing spillovers from the Russia-Ukraine conflict as it recovers from the third wave of the pandemic, the report said.

“India’s macroeconomic fundamentals remain strong. Unfolding global developments nevertheless pose downside risks in terms of spillovers,” the report said.

In its review of India’s macroeconomic indicators, the report took note of the spiralling trend in consumer prices. Headline consumer price index (CPI) inflation in February 2022 edged up to 6.1% from 6% in January. The report attributed the increase in headline inflation to month-on-month change in prices of 24 basis points (bps) in February being partially offset by favourable base effects — month-on-month change in prices a year ago — of 19 bps.

Price hikes by original equipment manufacturers (OEMs) to combat input inflation and higher retail fuel prices have increased the cost of ownership of capital equipment, the report said. Fuel inflation softened for the fourth consecutive month in February. Retail selling prices of petrol and diesel in the four major metros remain unchanged in March so far.

Even though liquefied petroleum gas (LPG) prices remained steady, kerosene prices increased in the first half of March. Last week, RBI deputy governor Michael Patra had said that although international crude prices present an overwhelming risk, headroom to adjust excise duties can delay the passthrough to consumer prices. The RBI would therefore treat the surge in crude prices as a supply shock in the setting of monetary policy, Patra said.

**Iran ready to meet India’s energy needs, Tehran envoy tells New Delhi**

*The Times of India | 18 March 2022*

Iran is ready to meet India’s energy security needs, its ambassador to India was quoted as saying, as negotiations continue between the world powers and Tehran on the lifting of sanctions against the OPEC-member. Iran used to be the second-largest oil supplier to India but New Delhi had to halt imports from Tehran after former US President Donald Trump withdrew from the nuclear deal with Iran and re-imposed sanctions on its oil exports.

“Rupee-rial trade mechanism can help companies from both the countries to deal with each other directly and avoid third party intermediation costs,” Ali Chegeni was quoted as saying by Indian facilitation body MVIRDC World Trade Center.

India, the world’s third biggest oil importer and consumer, covers over 80% of its crude oil needs with imports.

India and Iran had devised a barter-like mechanism to settle trade where Indian refiners were paying for Iranian oil in rupees to a local bank and the funds were used by Tehran to pay for imports from India.

Due to sanctions, the India-Iran trade declined sharply from $17 billion in the fiscal year to March 2019 to less than $2 billion in April-January, the first 10 months of this fiscal year.

Chegeni said, “If both countries launch rupee-rial trade mechanisms, the bilateral trade could grow to $30 billion”.

**Moody’s trims its 2022 growth estimate for India to 9.1%**

*Financial Express | 18 March 2022*

Global rating agency Moody’s trimmed its India growth forecast for the calendar year 2022, to 9.1% from 9.5% announced earlier, saying elevated fuel and fertiliser import bills in the wake of the Russia-Ukraine conflict would weigh on the government’s renewed push for capital expenditure. It also cut its 2023 growth forecast for the country marginally to 5.4%.
Given the surge in oil prices, the agency has sharply raised its inflation forecast for India to 6.6% for 2022 and 5% for 2023, up 160 basis points and 80 basis points, respectively, from the earlier projections.

Retail inflation hit an average of 5.4% between April and February, according to the government data. It scaled an eight-month peak of 6.07% in February, having breached the upper band of the Reserve Bank of India’s (RBI) medium-term target of 2-6% for a second straight month.

In its latest report on Global Macro Outlook 2022-23, Moody’s said global economic growth, too, will suffer and inflation will pick up as a fallout from Russia’s invasion of Ukraine. The conflict has significantly altered global economic backdrop through three main channels — surge in commodities prices, risks to the global economy from financial and business disruption, and dent in sentiment due to heightened geopolitical risks.

“India is particularly vulnerable to high oil prices given that it is a large importer of crude oil,” the agency said. However, it also noted that the country’s agricultural exports will benefit in the short term from high prevailing prices, given that India is a surplus producer of grain. “High fuel and potentially fertiliser costs would weigh on government finances down the road, potentially limiting planned capital spending,” it said. “Our forecast revisions also factor in the somewhat stronger underlying momentum than we had not accounted for previously,” it added.

Having witnessed a sharp Covid-induced contraction of 6.7% in 2020, India grew 8.2% in 2021, according to Moody’s.

The report said Russia is the only G-20 economy to shrink in the next two years, as it forecast a 7% contraction for Moscow for 2022 and 3% for 2023, down from the growth rates of 2% and 1.5% respectively, announced before its invasion of Ukraine. China’s economy is projected to grow 5.2% in 2022 and 5.1% in 2023, it added.

Commenting on the global economy, the agency highlighted that the potential for fresh Covid waves, monetary policy missteps and social risks associated with high inflation could dampen the growth outlook.

“The new negative energy price shock poses the risk of more pervasive inflation for longer and will also lead to higher interest rates, which will further weaken consumer spending and private investment,” the report said.

Supply disruptions of metals and other minerals from Russia and Ukraine throw a wrench in the supply chain recovery. “High prices of consumer essentials such as food and energy will take a toll on sentiment. Altogether, these factors will further slow economic growth in the coming quarters,” it said.

Moreover, the rise in fuel and metals prices will continue to weigh on supply-side cost pressures.

Fresh production delays and freight issues will limit output capacity. On the demand side, some countries may resort to subsidies to reduce the financial burden of higher prices. Any such move will only serve to keep demand for commodities artificially high, thereby aggravating global price pressures, the agency said.

**India-UAE trade pact: Bilateral trade projected to touch $100 bn in 5 years**

*Business Standard* | **17 March 2022**

The bilateral trade in goods is projected to increase from the current USD 60 billion to USD 100 billion annually within five years of the implementation of the India-UAE free trade agreement, parliament was informed.

India and the United Arab Emirates (UAE) signed the Comprehensive Economic Partnership Agreement (CEPA) on the sidelines of the India-UAE Virtual Summit held on February 18.

The India-UAE CEPA is a comprehensive and balanced partnership agreement that will give enhanced market access for India in both goods and services, Minister of State for Commerce and Industry Anupriya Patel said in a written reply to the Lok Sabha.

She said that the UAE has offered immediate market access at zero duty from Day 1 of the entry into force of the agreement to products accounting for around 90 per cent of India’s exports to the UAE in value terms.
As regards trade in services, the UAE has offered market access to India in around 111 sub-sectors from the 11 broad service sectors.

"Bilateral trade in goods is projected to increase from the current USD 60 billion to USD 100 billion annually within five years of implementation of the India-UAE CEPA," she said.

In another reply, she said there is no shortage of coal supply from sources of Coal India Limited (CIL) to tea gardens in the northeastern region.

"CIL has provided coal supplies to the tune of 618.70 million tonnes (MT) during the current fiscal (upto March 9, 2022) in comparison to 531.4 MT supplied during the same period last year, thereby achieving a growth of about 16.4 per cent," she added.

**Foreign trade policy set for another delay**

*Live Mint | 16 March 2022*

India’s much-delayed foreign trade policy (FTP) which was expected on 1 April has been delayed further, an official aware of the matter said, citing plans for wider industry-government consultations amid new geopolitical developments.

The policy will aim to complement the ongoing revamp of the special economic zones (SEZ) policy to make it compliant with World Trade Organization rules. It will cover ease of doing business, a ‘districts as exports hub’ scheme, promote geographical indication (GI) products and e-commerce. However, direct export sops are unlikely.

"I don’t think we can come up with the FTP on 1 April as still a lot of consultations need to be done. There is a change in the geopolitical climate too, which can be studied as far as opportunities for our industry is concerned. Besides, the commerce department is also occupied with handling the impact of the Russia-Ukraine conflict. It is likely that the existing will continue for another six months, “the official said.

The district hub scheme, likely to be part of the new FTP, will aim to help local producers in 700 districts to scale up manufacturing and find potential buyers outside India.

While the government will not introduce schemes and sops that are not WTO-compliant, existing ones like the export promotion capital goods (EPCG) scheme -- which allows duty-free imports of some capital goods used in manufacturing subject to specific export obligations -- may continue.

“The industry has been asking for incentives. But we have made it clear that the government cannot provide sops to everyone. The new initiatives need to be WTO-compatible. So, we can look at district hubs initiative, promotion of GI products, e-commerce, and other ease of doing measures,” said the official.

The government is currently revising the SEZ policy to make it WTO-compliant with a single-window clearance system with improved infrastructure and easy customs procedures. The Union budget has proposed replacing the existing SEZ Act with new legislation to enable states to become partners in the ‘Development of Enterprise and Service Hubs’ (DESH).

“The FTP may also have trade promotion measures including a dedicated ‘Trade Promotion Body’ to drive overall promotion strategy, set export targets, and execution. We need to create Brand India,” said the official. The FTP may also facilitate centralization and digitization of trade facilitation processes to drive ease of compliance and scheme administration.

**Trade deficit widens on high import costs**

*Live Mint | 15 March 2022*

India’s merchandise exports grew at a three-month low of 27.63% in February to touch $34.57 bn, while imports grew at a three-month high of 40.75% to $55.45 bn, leaving a trade deficit of $20.88 bn during the month, up from $17.42 bn in January, data released by the ministry of commerce and industry showed.

Exports touched $374.81 bn in the April to February period and are likely to exceed $410 billion, according to government’s projections.

However, economists cautioned that rising economic uncertainty from the Russia-Ukraine conflict could worsen the trade deficit and widen the current account deficit going forward as international oil prices are likely to remain elevated, while supply-side bottlenecks and rising freight costs could hurt exports.

“With the sharp rise in the trade deficit, we expect the current account deficit to have crossed 3% in Q3 FY2022, for the first time since the June 2013 quarter, before receding somewhat in the ongoing quarter. For FY2023, we project the current account deficit at 2.8% of GDP if the crude oil price averages at $115 a barrel, the likelihood of which will crucially depend on the duration of the geopolitical tensions,” said Aditi Nayar, chief economist, ICRA.

While overall imports in February are $3.52 billion higher than January, the non-oil non-gems and jewellery imports, which signify industrial activity in the economy were nearly $3 billion lower than in the previous month at $31.7 bn. India’s spend on petroleum products rose to $15.28 billion in February from $11.6 billion in January. Petroleum imports were 69.19% lower compared the same month last year.

Brent crude eased to $107 per barrel on Monday after touching a 14-year-high of $139 last week. Gold imports nearly doubled to $4.77 bn in February from $2.4 bn in the previous month as domestic demand recovered. However, this was 9.65% less
Besides an 88.14% growth in petroleum exports, outbound shipments in February were led by the strong performance of electronic goods, engineering goods, cotton yarn and chemicals, which grew by 34.54%, 32.04%, 33.01%, 25.38%, and 18.02%, respectively.

“While the industry has been grappling with high freight charges, the rise in global commodity prices is fast emerging as another major challenge going forward. The imminent hike in diesel and petrol prices would have its impact. But given the priority given to the exports sector, we hope that the government would help us sail through this challenge too,” Mahesh Desai, chairman, Engineering Exports Promotion Council (EEPC).

FTA with Australia likely on 21 Mar

Live Mint | 14 March 2022

India and Australia are likely to sign an interim free trade agreement (FTA) on 21 March, which may allow easier market access for Indian pharmaceutical products, besides duty concessions on gems and jewellery and textiles, said three people aware of the development.

The mini trade pact may also offer some concessions in the fields of education, tourism, health and renewable energy. Australia is likely to get tariff cuts on premium wines that do not compete with domestic winemakers. “The negotiations are at an advanced stage and the sides are hopeful of finalizing them by 21 March. It will also make way for a comprehensive free trade pact, the negotiations for which will begin after inking the early-harvest agreement,” one of the two people, a government official, said seeking anonymity.

The India-Australia interim trade deal follows the Supply Chain Resilience Initiative by India, Japan and Australia to reduce dependence on China. The deal is also aimed at bridging the trade gap between New Delhi and Canberra, which has more than doubled to $6.46 billion in favour of Australia, from $2.46 billion in 2020-21. While India’s exports surged 101% in the April to December period, its imports were 130% higher compared to the year-ago period. “We are expecting duty for apparel to be lowered because Australia is looking to shift away from China for its needs owing to deteriorating relations,” Narendra Goenka, chairman, Apparel Export Promotion Council, said.

India needs $20 billion annual investments to achieve climate targets, says report

Financial Express | 13 March 2022

India needs USD 20 billion (about RS 1.53 lakh crore) worth of investments each year to achieve its climate targets and fund its green transition, according to a report.

The white paper by Ficci and Trilegal highlights that the country needs a large budget allocation, international finance from bilateral and multilateral sources and green private investments.

The report also spotlights reforms in the power sector for encouraging environmental, social and governance-led investment in India’s climate transition.

Focussing on redefining corporate citizenship — the road to sustainability, the report details how corporates can contribute to the sustainability agenda, non-financial metrics and management of environmental, social and governance (ESG) risks.

As regulators actively incorporate ESG and sustainability factors into the legal framework, the ways in which companies operate will change, it added.

“India needs USD 20 billion worth of investments each year to achieve its climate targets and fund its green transition. It needs a large budget allocation, international finance from bilateral and multilateral sources and green private investments," the report stated.

‘Hyderabad to be first city to treat 100% sewage’

The Times of India | 13 March 2022

Municipal administration minister KT Rama Rao said 276 points have been identified in the city where underground drinking water and sewerage pipelines criss-cross and there is a danger of potable water getting contaminated at these points.

Recalling the tragedy of water contamination that had left 14 children dead in Bholakpur at Musheerabad in 2009, KTR said the state government has taken up rectification of all the 276 points and ensured that drinking water did not get contaminated with sewage water.

It was not easy to identify such lines particularly in the old MCH area. “There is no inventory of underground water and sewerage pipelines laid during the time of Nizam in the Old Hyderabad municipal corporation area,” he said.

The services of Pune-based Shah Technical Consultants were hired which conducted a detailed study and submitted a report as per which over 11,000 crore would be required to lay underground drainage network in GHMC and residential areas beyond Greater Hyderabad and up to one-kilometre beyond the Outer Ring Road.

“We have also approached the central government for funds regarding the nala development programme. The Centre said cities with over one lakh population are eligible to get funds under AMRUT-II scheme. But Greater Hyderabad has a population of over 1 crore. Even if we get 100-200 crore allocation under AMRUT-II, it won’t be enough for a city our size,” KTR said.
The minister also said rectification works have been taken up to delink the storm water drains from the sewage network. Only 46% of sewage used to be treated earlier, but chief minister K Chandrasekhar Rao-led government has taken up works to ensure that 100% sewage was treated, for which 3,866 crores were being spent to set up 37 sewage treatment plants (STPs). “Hyderabad will become the first city to have the capacity to treat 2000 million litres per day (MLD) sewage,” he said.

India, Canada agree to consider interim trade deal

Financial Express | 12 March 2022

India and Canada have agreed to resume negotiations for a free trade agreement (FTA) and are eying an interim trade deal to bolster bilateral commerce.

The move came after commerce and industry minister Piyush Goyal held talks with his Canadian counterpart Mary Ng, as part of the fifth ministerial dialogue on trade & investment.

While no timeframe has been given for hammering out the interim pact, official sources indicated that it could be concluded as early as in six-nine months. This will be followed up with the broader FTA.

Both the countries have now decided to expedite the negotiations for the India-Canada Comprehensive Economic Partnership Agreement (CEPA), as the FTA will be formally called, which was stalled for a long time.

Both the sides are now considering an Interim Agreement or Early Progress Trade Agreement (EPTA) that could bring early commercial gains to both the countries, according to a statement by the Indian commerce ministry.

The interim deal could include high-level commitments in goods, services, rules of origin, technical barriers to trade, and dispute settlement.

The negotiations are a part of India’s broader strategy to sign “balanced” trade agreements with key economies and revamp existing pacts to boost trade.


India’s merchandise exports to Canada rose 25% until January this fiscal from a year before to $3 billion, while Canada’s rose 10% to $2.6 billion.

Major Indian exports to Canada include drugs and pharmaceuticals, iron & steel, marine products, cotton fabrics & readymade garments (RMG) and chemicals, etc, while key Canadian exports to India comprise pulses, fertilizers, coal and crude petroleum, etc.

Export substitution: move to replace Russian supplies to EU

Live Mint | 11 March 2022

Indian exporters of iron and steel, jewellery, chemicals, plastics, aluminium, marine products and machinery are gearing up to increase their shipments to the European Union (EU) to try and fill a shortfall caused by disruptions to Russian exports.

In a report expected to be submitted soon to the ministry of commerce and industry, apex exporters’ body Federation of Indian Export Organisations (FIEO), has identified sectors where Russian exports to the EU exceed $500 million, said Ajay Sahai, the body’s director general and chief executive.

“Inorganic chemicals are an important area where India can look at expanding supplies to the EU. Jewellery could be another opportunity for exports. Same goes with plastics and marine.”

The EU buys gems and jewellery worth $22 billion, iron and steel products ($3.8 billion), organic chemicals ($1.4 billion) and inorganic chemicals worth $1.2 billion from Russia.

The EU accounts for 15% of Indian exports, and shipments to the region grew 59% to $50.7 billion in the nine months from April 2021 to January 2022. Biswajit Dhar, professor, Centre for Economic Studies and Planning, Jawaharl Nehru University, said iron and steel is a major sector that could gain significantly from the supply chain disruptions caused by EU sanctions. Europe is hugely dependent on Russia for iron and steel.

“In the last two years, we exported a huge amount of iron and steel to China, so we are capable of filling the supply chain gaps. The government must identify pain points and help the industry do better as these opportunities arise,” he added.

According to Dhar, Russia accounted for 15% of the EU’s imports in 2020. This opportunity has presented itself at a time when India’s merchandise exports are set to touch $400 billion for FY23. In the nine-months to January, India’s merchandise exports touched a record high of $335.44 billion, up 46.53% over $228.9 billion in the year-ago period.

India slips 3 spots on 17 SDG adopted as 2030 agenda, says report

Business Standard | 02 March 2022

India has slipped three spots from last year’s 117 to rank 120 on the 17 Sustainable Development Goals adopted as a part of the 2030 agenda by 192 United Nations member states in 2015, a new report said.

With the latest rankings, India is now behind all south Asian nations except Pakistan, which stands at 129. The south Asian countries ahead of India are Bhutan ranked 75, Sri Lanka 87, Nepal 96 and Bangladesh 109.

India’s overall Sustainable Development Goals (SDG) score was 66 out of 100.
According to the Centre for Science and Environments State of Indias Environment Report, 2022, released by Union Environment Minister Bhupender Yadav on Tuesday, Indias rank dropped primarily because of major challenges in 11 SDGs including zero hunger, good health and well-being, gender equality and sustainable cities and communities.

India also performed poorly in dealing with quality education and life on land aspects, the report stated.

The previous year, India had suffered on the fronts of ending hunger and achieving food security, achieving gender equality and building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation.

On the state-wise preparedness, the report said Jharkhand and Bihar are the least prepared to meet the SDGs by the target year 2030.

Kerala ranked first, followed by Tamil Nadu and Himachal Pradesh in the second position. The third position was shared by Goa, Karnataka, Andhra Pradesh and Uttarakhand.

Among the Union Territories, Chandigarh was ranked first, followed by Delhi, Lakshadweep and Puducherry in the second place and the Andaman and Nicobar Islands on the third, the report said.

The 2030 Agenda for Sustainable Development, was adopted by all United Nations Member States in 2015, which provides a shared blueprint for peace and prosperity for people and the planet.

There are 17 Sustainable Development Goals which are an urgent call for action by all countries in a global partnership.

Some of these goals are no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure.

It also includes, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions and Lastly strengthening global partnerships for the goals.

SC stays NGT ban on water purifiers where TDS below 500 mg per litre

Business Standard | 02 March 2022

The Supreme Court has stayed an order of the National Green Tribunal directing the Central Pollution Control Board (CPCB) to issue directions to all RO manufacturers banning water purifiers where the level of total dissolved solids (TDS) in water is below 500 milligrams per litre.

A bench of Justices S A Nazeer and Krishna Murari issued notices to the Ministry of Water Resources, Ministry of Environment and Forests, Central Pollution Control Board, and others.

‘Issue notice returnable within three months. Until further orders, the direction(s) contained in paragraph 6 of the impugned order are stayed’, the bench said.

The top court was hearing an appeal filed by the Water Quality India Association challenging the December 1, 2021 order of the NGT.

The NGT had directed the Central Pollution Control Board (CPCB) to issue directions to all RO manufacturers banning water purifiers where the level of total dissolved solids (TDS) in water is below 500 milligrams per litre.

The tribunal had also asked the CPCB to issue directions on the management of RO rejects, including cartridges.

“To secure compliance of orders of this Tribunal read with the order of the Supreme Court, we direct CPCB to issue an appropriate order under Section 5 of the Environment Protection Act, 1986 in terms of orders of this Tribunal to all the manufacturers so as to come into force within one month,” the NGT had said.

The tribunal had said gazette notification issued by the MoEF on “Regulation on the use of Water Purification System” cannot be said to be in compliance with its order.

“The Notification seeks to amend Rule 115 of Environment (Protection) Rule, 1986, Schedule I to the effect that all users of Domestic Water Purification System and other DWPS shall comply with the guidelines issued by CPCB.

“There is no provision for regulating and prohibiting RO systems where TDS is less than 500 mg/l, as directed by this Tribunal. There is also no supply chain management of the RO reject. Similarly, water wastage issue remains unaddressed,” the green panel had said.

The NGT had clarified that the CPCB order will be independent and uninfluenced by the Notification issued by the Ministry of Environment and Forests (MoEF).

The green panel had earlier said that huge wastage of water in the use of RO purifiers merely for advancing the commercial interest of companies at the cost of public interest needs to be checked.

It had directed the MoEF to issue notification without delay banning RO purifiers where the TDS level in water is below 500 milligrams per litre.

“The MoEF may issue appropriate notification prohibiting the use of RO where TDS in water is less than 500 mg/l and wherever RO is permitted, a requirement is laid down for recovery of water more than 60 per cent. Further provision be laid down for recovery of water up to 75 per cent. Further provision be laid down for recycling of water for purposes such as utensil washing, flushing, gardening, cleaning of vehicles and floor mopping,” the NGT had said.

In a bid to regulate the use of RO purifiers, the NGT had directed the government to prohibit them where
TDS is below 500 mg per litre and to sensitise the public about the ill-effects of demineralised water.

The tribunal has also asked the government to make it mandatory to recover more than 60 per cent water wherever RO is permitted across the country.

TDS is made up of inorganic salts as well as small amounts of organic matter. As per a WHO study, TDS levels below 300 mg per litre are considered to be excellent, while 900 mg per litre is said to be poor and above 1,200 mg is unacceptable.

Reverse Osmosis (RO) is a water treatment process that removes contaminants from water by using pressure to force molecules through a semipermeable membrane.

The order had come after perusing an expert committee report which said that if TDS is less than 500 milligrams per litre, a RO system will not be useful but will result in removing important minerals as well as cause undue wastage of water.

The tribunal was hearing a plea filed by NGO Friends seeking conservation of potable water by preventing its wastage on account of unnecessary use of RO systems.

Russia-Ukraine crisis: Exporters mull payment options as Moscow comes under sanctions

Business Line | 01 March 2022

India’s exports to Russia have come under a shadow following economic and banking sanctions imposed by the US, the UK and the EU on the country for invading Ukraine.

The Commerce and Industry Ministry is examining suggestions made by exporters, including the possibility of third country payments and allowing deals in rouble, but unavailability of insurance cover and rising freight rates are adding to the list of woes, according to sources.

“Commerce Ministry officials met exporters on Monday to take stock of the sanctions and their fall-out and also discuss various options to get around the problem of payments,” a source tracking the matter told BusinessLine.

Russia, which is India’s 25th largest trading partner, imports considerable volumes of tea, pharmaceuticals, mobile phones and other electronics, machinery, iron and steel and apparel from India. India’s total exports to Russia were valued at $2.6 billion in 2020-21, while imports were at $5.4 billion.

Since most Russian banks have been blocked by the EU and the US from the SWIFT international payment system, it would be difficult for Russian companies to make financial transactions, pointed out Anupam Shah, an exporter of engineering products.

“Some Russian importers, who have entities in other countries such as Turkey, Hong Kong or UAE, have suggested that India should allow third country payments. But this could lead to payment delays and other issues might crop up such as need for advance declaration at time of shipment. Commerce Ministry officials will meet officials in the Finance Ministry, the RBI and banks to discuss if some relaxations could be given,” the source said.

The other option of allowing deals to be carried out in rouble instead of the US dollar, could enable smooth payments, but would be a complicated exercise as rouble is not a freely convertible currency and determining the exchange rate could be an issue. “Especially with the value of the rouble falling steeply one has to see how frequently the exchange rate would need to be revised,” the source added.

While items like food, pharmaceutical and energy are excluded from the sanctions, the situation is challenging for these sectors. The withdrawal of ECGC cover on exports to Russia is unfair and risk cover should be restored immediately, said Sujit Patra from the Indian Tea Association.

“Shipment cost has gone up multiple times. The Centre should consider assistance to exporters to defray some cost. Banks need to provide more pre and post shipment working capital with higher interest subvention,” Patra added.

Sales of manufacturing companies grow 27.3% in December quarter: RBI data

Free Press Journal | 01 March 2022

Aggregate sales of 1,701 listed manufacturing companies recorded a growth of 27.3 per cent in the third quarter of 2021-22 on an annual basis, aided by high sales growth in petroleum, non-ferrous metals, iron and steel, chemicals and textiles industries, according to RBI.

RBI released the data on the performance of the private corporate sector during the third quarter of 2021-22 drawn from abridged quarterly financial results of 2,744 listed Non-Government Non-Financial (NGNF) companies.

“Sales of listed private non-financial companies increased (y-o-y) by 25.3 per cent in the third quarter of 2021-22 as compared with 31.8 per cent in the previous quarter and 4 per cent in the corresponding quarter a year ago,” the RBI said.

As per the data, aggregate sales of 1,701 listed manufacturing companies recorded steady growth (y-o-y) of 27.3 per cent, aided by high sales growth in petroleum, non-ferrous metals, iron and steel, chemicals and textiles industries.

In value terms, the sales of manufacturing companies stood at Rs 8,87,137 crore in the third quarter as against Rs 6,79,462 crore (1,685 companies). Their net profits stood at Rs 88,167 crore during October-December period of 2021-22 as against Rs 73,789
India among countries that will be most ‘economically harmed’: IPCC report

India will face extreme scenarios emerging from climate change on almost all fronts — from rising sea levels to groundwater scarcity, from extreme weather patterns to a fall in crop production, besides a rise in health hazards. The United Nations Intergovernmental Panel on Climate Change (IPCC) presents this grim picture in the second part of its sixth assessment report.

Referring to India as one of the countries that will be most “economically harmed” by climate change, the report highlights a risky anomaly of it facing both rising sea levels and water scarcity. “India is one of the most vulnerable countries globally in terms of the population that will be affected by sea-level rise. By the middle of the century, around 35 million people in India could face annual coastal flooding, with 45-50 million at risk by the end of the century,” says the report by the IPCC Working Group (WG)-II.

According to the studies cited by the IPCC, climate change and rising demand would lead to at least 40 per cent of the Indian population living with water scarcity by 2050 compared with about 33 per cent now. It is estimated that both the Ganges and Brahmaputra river basins will witness increased flooding as a result of climate change, particularly if warming crosses 1.5 degrees Celsius.

In August last year, the WG-I had declared a climate emergency and said that under all growth scenarios, the planet’s warming level will touch 1.5 degree Celsius. The WG-II focuses on the impact of climate change on ecosystems, biodiversity and human communities. For WG-II, 270 authors contributed to the report.

This report conclusively says that the world faces unavoidable multiple climate hazards over the next two decades with global warming of 1.5°C. The dual impact of rising sea levels and ground water scarcity will have a direct impact on the Indian agriculture sector. One of the chapters in the report says that wheat, pulses, coarse and cereal yields could fall almost 9 per by 2050 in the country. In South India, maize production could decrease 17 per cent if emissions are high. “These disruptions to crop production are expected to cause price spikes in India, threatening food affordability, food security and economic growth.

Continued climate change will also cause decline in India’s fisheries,” says the report.

Climate change is impacting every part of India, says Anjal Prakash, research director, Bharti Institute of Public Policy, Indian School of Business (ISB). “The Himalayas in the north, coastal areas in the south and the semi-arid region in central India — no part of the country is spared. Urban India is at much greater risk with its increasing share in the country. In the next 15 years, we will see 600 million people being added to urban spaces,” says Prakash, who is also the lead author of the chapter on cities in WG-II.

At the macroeconomic level, too, India stands to lose due to the impact of climate change, caution studies cited in the report. India is economically harmed the most by climate change, with every tonne of carbon dioxide emitted globally costing the country around $86, according to a study cited in the report.

During COP26, the climate change conference in Glasgow last year, India had made a case for having an adaptation fund by the developed world to support the climate hazards faced by developing economies like itself. Developed economies, however, committed to no separate loss-and-damage fund, leading to India issuing a note of “deep disappointment”.

“Developed countries must accept the historical responsibility and provide the financial resources to the developing countries,” India had said.

WG-II experts have reiterated the need for an equitable adaptation across the globe to tackle the ill-effects of climate change. “While there are some efforts on adaptation, the impacts are not distributed equally. India, Bangladesh are the most vulnerable although they are not responsible for climate change. This is why equity and justice become very crucial,” Rawshan Begum Ara, visiting associate professor at the Centre for Corporate Sustainability & Environmental Finance, Macquarie University, Australia, had said during the conference.

IPCC Sixth Assessment Report Working Group-II
WG-II focuses on impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels and adaptation strategies.

India being hailed as one of the most vulnerable countries to climate change related impact.

Global sea levels will likely rise 44-76cm this century, in India 35 million face risk of rising sea level related hazards. Economic impact also highest.

Crop production to be hit severely with rising cases of heat waves, drought, floods

Every tonne of carbon dioxide emission to cost $86 to Indian economy

Health hazards, especially communicable diseases, instances of widespread flu to increase

Gati Shakti to slash project overruns: PM

Live Mint | 01 March 2022

Urging the private sector to invest in the country’s infrastructure, Prime Minister Narendra Modi outlined how the Gati Shakti project will reduce compliance burden and bring down the time and cost overrun of projects.

Addressing a post-budget webinar on the vision of Gati Shakti, the prime minister asked the private sector to use data on existing and proposed infrastructure besides forest and industrial estate available in the National Master Plan for their planning.

“In PM Gati-Shakti National Master Plan, more than 400 data layers are available now…not just the existing and proposed infrastructure but also information about the forest land and available industrial estate…the private sector should use it more and more for their planning,” he said. The PM added that all important information regarding the National Master Plan was now available on the single platform. “Due to which it will be possible to get project alignment and various types of clearances at the DPR (detailed project report) stage itself. This will also be helpful in reducing your Compliance Burden”, he said.

PM Gati Shakti will ensure true public-private partnership in infrastructure creation from infrastructure planning to development and utilization stage, PM added.

The PM also asked the state governments to make the PM Gati-Shakti National Master Plan as base for their projects and economic zones. Underlining the lack of coordination among the stakeholders in the traditional ways of completing projects, Modi said that PM Gati Shakti, will also lead to optimum utilization of the country’s resources as everyone will be able to make their plan with complete information. He added that ‘infrastructure-based development’ will lead to an extraordinary increase in the strength of India’s economy, creating many new possibilities of employment.

The government has made a ₹7.5 trillion capital allocation in the budget for 2022-23, as against ₹5.54 trillion last year. “Infrastructure Planning, Implementation and Monitoring will get a new direction from PM Gati-Shakti. This will also bring down the time and cost overrun of the projects”, he added. Of the ₹7.5 trillion capital allocation, ₹1 trillion will be allocated to states for development of infra projects. “State governments will be able to use this amount on multimodal infrastructure and other productive assets,” he said.

Modi pointed out that India’s logistic cost in India is considered to be 13-14% of GDP, more than other major countries. He added that the Unified Logistic Interface Platform (ULIP) provided in this budget will lead to reduced logistics cost. “24 Digital Systems of 6 Ministries are being integrated through ULIP. This will create a National Single Window Logistics Portal which will help in reducing the logistics cost,”, he added.

Russia-Ukraine crisis: FM Sitharaman worried over impact on exporters

Business Standard | 01 March 2022

Finance Minister Nirmala Sitharaman expressed concern over the future of exporters owing to the Ukraine crisis as this is set to jack up international freight rates and crude prices further.

She also asked the Indian industry — engaged in the war-torn region — to come up with suggestions to tide over the crisis.

“I am more worried about what’s going to happen to our exporters, who are doing very well,” she said while addressing the industry in a post-Budget interaction in Chennai. She also expressed worry about essentials like sunflower and fertilisers for which the country is dependent on the region.

There is likely to be a huge spike in the commodities and fertiliser market. Russia was the largest exporter of urea, NPKs, ammonia, UAN and ammonium nitrate last year. Russia accounts for around 34 per cent of global wheat exports.

In oilseeds, Russia and Ukraine contribute 80 per cent of the global sunflower exports and 19 per cent of world’s corn supplies. For India, the edible oil industry is worried and is expected to see a spike in prices as India and Russia account for 90 per cent of India’s sunflower oil.

“As regards to what is going on, it will have a bearing on our immediate imports, and equally, exports to Ukraine. We are rightly worried about what comes from there,” she added, responding to a question by Mallika Srinivasan, chairman and managing director of Tractors and Farm Equipment.

The finance minister also raised concerns over the impact on the farm sector as it also forms a considerable share of exports to Russia and Ukraine. India’s bilateral trade with
Russia was $11.9 billion in 2021 — $3.3 billion exports and $8.6 billion imports. Indian imports include crude oil, petroleum products, fertilisers, gold and coal.

On the other hand, India’s trade with Ukraine last year stood at $3.1 billion — exports at $510 million and imports at $2.6 billion. The FM also said that the ministry is looking into the exports for which payments have already been made.

“For all these issues, I would have a comprehensive look. I will have to get a complete assessment done through the concerned ministries,” Sitharaman added.

On the other hand, the shipping sector is also expecting freight and charter rates to go up.

According to industry estimates, charter rates may even go up by 40 per cent for a 4,200 TEU (20-foot equivalent unit) from $70,000 a day now to even $100,000. She assured the industry that the government is taking stock of all the aspects of the crisis.

**Chemicals and Petrochemicals**

**India is working towards being energy independent by 2047: Amitabh Kant**

*Indian Chemical News | 25 March 2022*

Amitabh Kant, Chief Executive Officer, NITI Aayog is bullish about India’s foray into the manufacturing of green hydrogen and its ability to emerge as a major exporter of renewable energy in the next two decades.

“India has some competitive level in terms of cost of electricity, solar and wind energy in the world and given the low electricity cost, it is beneficial to expand green hydrogen production in India rather than the production of grey or blue hydrogen. Our internal analysis indicates that the cost of green hydrogen will fall to approxi-

mately one US dollar per kg in 2030 at 0.70 US dollar per kg by 2050. Regardless of the scenario, the conclusion is clear that the future of energy belongs to green hydrogen,” Kant remarked at the Indo Japan Hydrogen Seminar 2022 organized by the New Energy and Industrial Technology Development Organization (NEDO), Japan on March 24, 2022.

Kant emphasized on the importance of Indo-Japan partnership over green hydrogen.

“India and Japan can collaborate on green energy initiatives, working together in terms of technology, extending cheap finance in green hydrogen development and ensuring that our production is marked for exports. I think there is an opportunity for close collaboration between two counties on climate change. India has the ecosystem to produce green hydrogen at low cost and is a green manufacturing destination. It has the skills, enterprise and entrepreneurial ability. At the same time, Japan’s commitment to drive green manufacturing can be done in partnership with India. We look forward to it.”

Sharing his thoughts on India’s commitment to non-fossil fuels, Kant added: “India has 17% of the world population but contributes only 5% of the total carbon emissions. We have left no stone unturned in our fight against climate change. We are targeting non-fuel energy capacity of 500 GW and 50% cumulative electric power capacity from non-fossil fuel based energy resources. We will reduce the total projected carbon emissions by 1 billion tonnes. We will reduce the intensity of carbon emissions on the Indian economy by less than 45% and we will aim to become energy independent by 2047 and the net zero by 2070.”

“Today India has built a successful globally competitive renewable energy industry and produced over 100 GW of clean energy. We have world class clean energy players with top notch execution capacity. India ranks 4th in the world because of installed renewable energy capacity. The share of non fossil fuel has already reached almost 40%. India has demonstrated to the world that by bringing the energy cost down it makes complete sense for India to become a hub for green hydrogen production and exports. The thrust on green ammonia would result in bringing down the cost of hydrogen further. This will create a trigger for domestic market transformation and simultaneously by mandating the green hydrogen consumption obligation will lead to decarbonisation in the refineries and fertilizer units in the initial phase, which can then be expanded to other sectors later on. India roughly spends over 160 billion of foreign exchange on imports and these imports are likely to double in next 15 years without remedial action,” Kant elaborated.

Talking about the growth drivers, Kant stated: Currently, India consumes about 9% of global grey hydrogen production which is about 5.6 MMTPA. The total hydrogen market in India is expected to grow up to 11.7 MMTPA by the year 2030. Among the major consuming sectors are refinery, fertilizer. In the longer run, steel, transportation and power sectors, blending with gas and heavy duty trucking are likely to drive the majority of demand growth, accounting for close to 50% by 2050.

On the challenges that need to be addressed during the hydrogen transition, Kant said: “The cost of green hydrogen production is slightly higher than fossil fuel alternatives and there has to be a focus on R&D. Transportation of hydrogen in green ammonia, building infrastructure necessary to bring down the cost of green hydrogen. Formulating whole regulation standards, financing and scale remains a big challenge. The government is formulating National Green Hydrogen Mission in India and the objective is to ensure the percentage of green hydrogen consumption obligations for refinery and fertilizer sectors are met. There is an incentive structure for
manufacturing the electrolyzers and its components and to have technical safety standards, specifications for labeling green hydrogen and ammonia to facilitate exports. Additionally, it will be worth it to create industrial corridors for hydrogen ammonia production.”

**Global Inflation elevates the prices of Chlorine in March**

Chemanalyst | 22 March 2022

The price of Chlorine rose sharply in March, in the wake of strong demand from the national and regional market. Market players have been forced to revise their offerings to boost profitability. In addition, they also had to deal with the rising input costs, a situation that has remained a major concern for domestic producers as it has long squeezed their margins. Meanwhile, domestic traders took advantage of the shortage and increased their bids on existing inventory. Additionally, demand fundamentals for the product from the downstream polymer industry remained favorable, showcasing an upward trend for the prices of Chlorine.

Chlorine acts as a vital feedstock for the chlor alkali industry. The prices are mainly increasing due to the growing demands from the pharmaceutical and agrochemical industries and the call for PVC from the development sector. The supply chain is being affected mainly because of the ongoing geopolitical tension. Shortage of chlorine has been affecting the Europe marketplace majorly. As Russia is an important exporter of chlorine for Europe, the chlorine expenses in Germany surged to massive ranges following unsure plant working costs and excessive electricity expenses. Although electricity expenses with admire to the preceding area marginally eased, they remained at better ranges with admire to the first half of the ultimate year.

Chlorine price surge, helped by the growing demand from the packaging industry, the market is expected to witness further growth in the forecast period. As per ChemAnalyst, “As Liquid Chlorine is a major raw material for PVC manufacturing, its prices are expected to continue tracing an upward trajectory with the likelihood of an increment in its demand from PVC segment as the economy is likely to gather appreciable pace by the end of Q1 2022.”

**Members’ News**

**Grasim to ramp up chemical plant capacity by 439 KTPA in next 3 years**

Indian Chemical News | 10 March 2022

Global chemical manufacturer Grasim Industries plans to commission chemical plants with the capacity of 439 Kilo Tonnes Per Annum (KTPA) during the next three years. Among these are BB Puram (Andhra Pradesh) with 47 KTPA capacity (Phase -1) during Q1 of FY23. The same plant at BB Puram will add 73 KTPA (Phase -2) during Q3 of FY23.

The company’s Vilayat plant in Gujarat will add 146 KTPA during Q1 of FY24. The epoxy expansion plant will add 123 KTPA in Q1 of FY24 and finally the epichlorhydrin (ECH) project will add 50 KTPA during Q1 of FY25. Through brownfield expansion, the company plans to expand the caustic soda capacity to 1,530 KTPA from 1,264 KTPA by FY24.

In 2016, Grasim’s merger with Aditya Birla Chemicals helped catapult the company’s caustic soda capacity from 452 KTPA to 884 KTPA making it the largest producer of caustic soda in India back then. Today, Grasim’s total caustic soda capacity is 1,264 KTPA. The company has eight caustic soda manufacturing units across India. There are 1,147 KTPA total caustic soda capacity and 123 KTPA capacity epoxy plant. It records ~1 million tonnes of caustic sales annually.

In the caustic soda category, the company has increased its capacity from 1,147 KTPA in 9 months of FY 21 to 1,264 KTPA in 9 month of FY22 at 10% change year on year. The production increased from 629 KT to 775 KT with a YoY change of 23%. The sales volume was 634 KT to 771 KT with a YoY change of 22%.

The flagship company of the Aditya Birla Group has the capacity utilization of caustic soda business scaled up to a multi-year high of 93% in the third quarter (Q3) of FY22, an improvement of 7% quarter on quarter (QoQ). During the fiscal year 2022, the company added 171.8 KTPA including 91KTPA at Rehla plant during third quarter (Q3) of FY22; 54.8 KTPA at Vilayat CMS in Q3 of FY22. At BB Puram plant, it added 26 KTPA (Phase -1) in Q3 of FY22.

The business’ epoxy products range from basic products like liquid epoxy resins to value added products like formulated resins, reactive diluents and hardeners. The manufacturing complex at Vilayat houses a 123 KTPA capacity epoxy plant. Through expansion, the company plans to double the epoxy capacity to 246 KTPA by FY24.

The chlor-alkali business is on the path to increase the share of green power to 10% (FY23) from 3.4% (9M FY22) in the overall power mix which will lead to reduction of carbon emissions and cost competitiveness. Advanced Material business witnessed a YoY improvement in the operational and financial performance driven by better product mix on back of strong demand from the wind segment.

Among India’s largest chlor-alkali producers, the company is top 5 and pioneers in the manufacture of epoxy resins globally (manufacturing facilities in India, Thailand and Germany). The company is a leading producer of sodium and potassium phosphates. It is among the top 3 globally in sodium sulphite and sodium metabisulphite.
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Mob.: 0086 13574290222 (Mr. Frank Ding), 0086 18773335922 (Mr. Zhang)
Email: frankding@kori.cn, zsy@kori.cn
Website: www.kori.cn
ATTENTION TO ALL GROUND WATER USERS INCLUDING INDUSTRIAL/ INFRASTRUCTURE/ MINING PROJECTS

Whereas the Authority has issued ‘Guidelines to control and regulate ground water extraction in India’ vide notification number 3289(E) dated 24th September, 2020.

And whereas the Authority has issued Public Notices dated 26.10.2020, 08.01.2021 and 27.01.2021 wherein the concerned project proponents were informed to mandatorily submit Impact Assessment Report/ comprehensive Hydro-geological Report/ Water Audit Report by a specified date and the late submission of Impact Assessment Report/ comprehensive Hydro-geological Report were subjected to the payment of Environmental Compensation as per CGWA Guidelines, calculated from 01.01.2021 till the date of submission of the report.

And whereas the Authority has issued Public Notice dated 17.06.2021, providing last date as 31.03.2022 for submission of Impact Assessment Reports by industries, Comprehensive Hydrogeological reports by Mining Projects and installation of tamper-proof Digital Water Flow Meters with or without telemetry and for an exemption of Environmental Compensation by the existing users who failed to submit application for NOC till 30.06.2020.

THIS IS TO BRING TO THE NOTICE OF ALL GROUND WATER USERS THAT:

1. For the submission of Impact Assessment Reports by industries, Comprehensive Hydrogeological reports by Mining Projects and Water Audit Reports, the date is hereby extended upto 30.06.2022. No Environmental Compensation shall be imposed on such users if the said report is submitted in the prescribed time. The Environmental Compensation already paid by the project proponents shall be adjusted in the Abstraction/restoration Charges of the unit for subsequent years.

2. All the project proponents/users who have obtained NOC for drawing ground water shall be required to mandatorily install Piezometer and tamper-proof Digital Water Flow Meter with / without Telemetry System as per CGWA Guidelines by 30.06.2022 or as specified in NOC, whichever is later.

3. **Registration of Ground Water Users** – All the existing ground water users are hereby given one-time opportunity to register their ground water withdrawal by paying registration fee of Rs. 10,000 which will be adjusted at the time of submission of the complete Application. Such registered users shall be exempted from payment of Environmental Compensation, if they submit complete application before 30.09.2022, failing which Environmental Compensation shall be levied as per CGWA Guidelines. All other conditions shall remain unchanged.

Member Secretary

CGWA
1. (a) Extension of Foreign Trade Policy 2015-2020 - 31/03/2022
   https://content.dgft.gov.in/Website/dgftprod/f3e0536b-7935-4e6c-899e-00cf5e4532f1/Notification%20No%2064%20English.pdf

   (b) Extension of Handbook of Procedures 2015-2020 - 31/03/2022
   https://content.dgft.gov.in/Website/dgftprod/3094e873-c96c-4c6f-bd63-d353bee94f9d/P%20N%2053%20English.pdf

2. ABS, EDC, VCM & PC QCO Amendment Order, 2022 - 11/03/2022
   https://chemicals.nic.in/sites/default/files/234048.pdf

3. Model contract for use of Biomass in Thermal Power Plants (TPPs) - 03/03/2022

## 1 Alkali Imports (MT)

<table>
<thead>
<tr>
<th></th>
<th>Qty (Feb 2022)</th>
<th>Qty (Feb 2021)</th>
<th>% Difference (Y-o-Y)</th>
<th>Qty (Jan 2022)</th>
<th>% Difference (M-o-M)</th>
<th>FY 2021-22 (upto Feb)*</th>
<th>% Difference</th>
<th>FY 2020-21 (upto Feb)*</th>
<th>% Difference</th>
<th>Total Imports 2020-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caustic Soda</td>
<td>11,829</td>
<td>28,114</td>
<td>-57.9%</td>
<td>17,755</td>
<td>-33.4%</td>
<td>177,335</td>
<td>-40.0%</td>
<td>295,560</td>
<td>-19.9%</td>
<td>314,110</td>
</tr>
<tr>
<td>Soda Ash</td>
<td>54,310</td>
<td>67,817</td>
<td>-19.9%</td>
<td>64,943</td>
<td>-16.4%</td>
<td>533,886</td>
<td>-19.9%</td>
<td>666,729</td>
<td>-19.9%</td>
<td>705,966</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>561</td>
<td>1,855</td>
<td>-69.8%</td>
<td>1,705</td>
<td>-67.1%</td>
<td>14,615</td>
<td>-34.4%</td>
<td>22,273</td>
<td>-34.4%</td>
<td>24,451</td>
</tr>
</tbody>
</table>

Average Price in Feb 2022: Caustic Soda - 589 USD/MT (Lye), 688 USD/MT (Flakes) & 688 USD/MT (Solids); Soda Ash - 268 USD/MT; Sodium Bicarbonate - 378 USD/MT

## 2 Foreign Trade - Merchandise (US$ billion)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Feb 2021</th>
<th>% Difference</th>
<th>&quot;FY 2021-22 (upto Feb)*&quot;</th>
<th>% Difference</th>
<th>Total Imports 2020-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imports</td>
<td>55.5</td>
<td>40.8</td>
<td>36.1%</td>
<td>550.6</td>
<td>59.3%</td>
<td>389.2</td>
</tr>
<tr>
<td>Exports</td>
<td>34.6</td>
<td>27.6</td>
<td>25.1%</td>
<td>374.8</td>
<td>46.1%</td>
<td>290.6</td>
</tr>
<tr>
<td>Surplus/Deficit</td>
<td>-20.9</td>
<td>-13.1</td>
<td>-175.8</td>
<td>-89.0</td>
<td>-98.6</td>
<td></td>
</tr>
</tbody>
</table>

## 3 Exchange Rate (Rs./USD)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Jan 2022</th>
<th>Dec 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75.00</td>
<td>74.44</td>
<td>75.37</td>
</tr>
</tbody>
</table>

## 4 Index of Industrial Production (Base: 2011-12=100)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Feb 2021</th>
<th>% Difference#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>132.1</td>
<td>129.9</td>
<td>1.7%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>130.8</td>
<td>129.7</td>
<td>0.8%</td>
</tr>
<tr>
<td>Electricity</td>
<td>160.8</td>
<td>153.9</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

## 5 Index of Core Industries (Base: 2011-12=100)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Feb 2021</th>
<th>% Difference#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>131.2</td>
<td>117.9</td>
<td>4.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>119.0</td>
<td>113.5</td>
<td>2.4%</td>
</tr>
<tr>
<td>Electricity</td>
<td>167.3</td>
<td>136.6</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

## 6 Index of Industrial Production - Broad Sectors (Base: 2011-12=100)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Feb 2021</th>
<th>% Difference#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>132.2</td>
<td>117.9</td>
<td>4.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>130.8</td>
<td>129.7</td>
<td>0.8%</td>
</tr>
<tr>
<td>Electricity</td>
<td>160.8</td>
<td>153.9</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

## 7 Index of Industrial Production - Manufacturing Sub-groups (Base: 2011-12=100)

<table>
<thead>
<tr>
<th></th>
<th>Feb 2022</th>
<th>Feb 2021</th>
<th>% Difference#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical &amp; Chemical Products</td>
<td>116.7</td>
<td>111.9</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Textiles</td>
<td>116.2</td>
<td>113.5</td>
<td>2.4%</td>
</tr>
<tr>
<td>Paper &amp; Paper Products</td>
<td>79.0</td>
<td>79.3</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Basic Metals</td>
<td>179.8</td>
<td>163.6</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

# The growth rates over corresponding period of previous year are to be interpreted considering the unusual circumstances on account of Covid-19 since March 2020.

## 8 Index of Industrial Production Country-wise Comparisons (Base: 2015=100)

<table>
<thead>
<tr>
<th></th>
<th>Nov 2021</th>
<th>Nov 2020</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>Feb 2022</td>
<td>Feb 2021</td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>118.6</td>
<td>116.6</td>
<td>1.7%</td>
</tr>
<tr>
<td>Brazil</td>
<td>NA</td>
<td>112.6</td>
<td></td>
</tr>
<tr>
<td>European Union (27)</td>
<td>NA</td>
<td>98.8</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>108.5</td>
<td>105.6</td>
<td>2.7%</td>
</tr>
<tr>
<td></td>
<td>102.7</td>
<td>95.6</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Index over 50 shows expansion, while below 50 means contraction

Data Source: GOI, OECD, IHS & AMAI Research
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**Reference List**
- Orient Paper Mills, M.P.
- Grasim Industries, Ganjam
- Gharda Chemicals, Lote
- Koruma Tarim, Turkey
- TGV SRAAC Ltd., Kurnool (Formerly, Rayalseema Alkalies)
- Punjab Alkalis & Chemicals Ltd., Chandigarh

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