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- Inconel
- Monel
- Hastelloy
- Titanium
- Stainless Steel
- Duplex Steel
- Carbon Steel

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METAL TUBE INDUSTRIES
64, C. P. Tank Road, Mumbai - 400 004.
Dear Reader,

The two major chemical accidents that took place recently at Dahej and Visakhapatnam brought to focus the importance of safe handling of chemicals and the need to observe all safety protocols, particularly as the “Unlockdown” measures announced by the government signalled the resumption of manufacturing activities. Accidents involving chemicals always get more attention as the impact on human life and environment is often many times more pronounced than those that do not involve chemicals. The repercussions and mitigation measures are also more complex. The word “chemicals” generally conjures up a negative perception among the populace and an accident involving chemicals tends to create more panic.

The Department of Chemicals & Petrochemicals (DCPC) have always emphasised on implementation and review of safety measures in Plants. Following the accident, DCPC held discussion meetings to review safety steps in the chemical industry. The Department also reminded the need for prominent industries to procure specialised equipment to fight disasters like chemical industry related mishaps. Such specialised equipment could then be used at different places whenever the need arises. As the equipment are procured by the industry, the District Administration is to be kept informed of the resources available for optimal deployment in case of need.

Most alkali plants have fire tenders and other equipment for quick deployment in case of emergencies. There are also instances when these are used by adjoining industries as a shared resource, minimising the adverse impacts of accidents. The Indian alkali industry has a good safety record. Together with a high level of compliance on environmental parameters, the industry can stake its claim to be ahead of most other segments. AMAI is also the first chemicals industry Association to have established an independent Safety-Health-Environment Cell in its Secretariat. AMAI SHE Cell extended the concept of safety in Plant to transit safety to ensure safe transportation and storage of alkali chemicals.

AMAI on its part, has also convened meetings of Safety Heads in all Plants to discuss and review matters relating to safety. The increasing frequency of meetings on safety is an indicator of the importance the industry accords to safety. AMAI also plans to develop a comprehensive safety document for all chlor-alkali Plants with prescriptions on minimal safety parameters that need to be monitored.

We have been uploading the Alkali Bulletin on the AMAI website (www.ama-india.org) from the February 2020 issue. We have recently upgraded this as a flip-book with a download option as a value-added feature for our esteemed readers.

K. Srinivasan
Secretary General
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Historically, soda ash was produced by extracting the ashes of certain plants, such as Spanish Barilla. The land plants and the seaweed were harvested, dried and burned, the ashes were then washed with water to form an alkali solution. The solution was boiled dry to produce the final product, soda ash. The concentration of sodium carbonate in soda ash varied very widely, from 2-3% for the seaweed to 30% for the barilla from land plants in Spain.

**Synthetic Processes**

1. **Le Blanc Process**

   This process or black ash process was invented by Nicolas Le Blanc, a French man, who in 1775, among several others submitted an outline of a process for making soda ash from common salt, in response to an offer of reward by the French academy in Paris. Le Blanc's proposal was accepted and workable on a commercial scale.

   **Reactions:**
   
   \[
   2\text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{HCl} \\
   4\text{C} + \text{NaSO}_4 \rightarrow \text{NaS} + 4\text{CO} \\
   \text{Na}_2\text{S} + \text{CaCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CaS}
   \]

   **Process Description**

   A mixture of equivalent quantities of salt and concentrated sulphuric acid is heated in cast iron salt cake furnaces. Hydrochloric acid gas is given off and sodium hydrogen sulphate is formed. The gas is dissolved in water and the mixture is raked and transferred to the muffle bed reverberatory furnace where it is subjected to stronger heat. Here sodium sulphate called salt cake is formed.

   The cake is broken, mixed with coke and limestone and charged into black ash furnaces. The mass is heated and a porous grey mass known as black ash is withdrawn.

   The black ash is cursed and leached with water in the absence of air in a series of tanks. The extract containing sodium carbonate, sodium hydroxide and many other impurities is sprayed from the top of a tower counter current to the flow of hot gases from the black ash furnace. This converts sodium hydroxide, aluminate, silicate, cyanate to sodium carbonate. The liquor is concentrated in open pans until the solution is concentrated enough to precipitate sodium carbonate on cooling. The product is calcined to get crude soda ash which is purified by recrystallisation.

   The liquor remaining after removal of first crop of soda crystals is purified to remove iron and causticated with lime to produce caustic soda.

   The mud remaining in the leaching tanks containing calcium sulphide is suspended in water and lime kiln gas is passed through it. The following reaction occurs.

   \[
   \text{CaS} + \text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{CaCO}_3 \downarrow + \text{H}_2\text{S}
   \]

   The lean gas containing hydrogen sulphide is passed through another tank containing suspension of calcium sulphide.

   \[
   \text{CaS} + \text{H}_2\text{S} \rightarrow \text{Ca}(\text{SH})_2
   \]

   This solution is again treated with lime kiln gas liberating a gas rich in hydrogen sulphide.

   \[
   \text{Ca}(\text{SH})_2 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{CaCO}_3 \downarrow + 2\text{H}_2\text{S}
   \]

   The hydrogen sulphide is burnt in limited supply of air in a special furnace in presence of hydrated iron oxide as a catalyst to obtain sulphur.

   \[
   \text{H}_2\text{S} + 1/2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{S}
   \]

   The sulphur is sublimed and collected.

   The Le Blanc process which is now of only historical interest. The letter that was published in the Liverpool Mercury in October 1827 stated that the Muspratt's works poured out volumes of sulphurous smoke which made the whole atmosphere dark, and also changed the stone colour to dark. The smoke also affected the health of the people staying nearby. The other environmental impact was the emission of the large quantities of hydrochloric acid gas and the production of calcium sulphide which emit poisonous gas. This process was rediscovered and perfected by Ernest Solvay in 1861.

   The last Leblanc plant was closed down in 1923.

2. **Solvay Process or Ammonia-Soda Process**

   The discovery of the chemistry of the ammonia-soda process can be traced back to the early 1800s. A few British and French plants operated in 1840-1860, but without success. The ammonia-soda process is usually called the Solvay process because in 1865 Ernest Solvay started the first really successful plant at couillet in Belgium.
In 1874, the first successful ammonia-soda plant was erected in England. The ammonia-soda process is the dominant technology used throughout the world, hence this process is selected for production of soda ash.

**Overall reaction**

\[
\text{CaCO}_3 + 2\text{NaCl} \rightarrow \text{Na}_2\text{CO}_3 + \text{CaCl}_2
\]

This reaction takes place in a number of steps

1. \(\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2\)
2. \(\text{C} + \text{O}_2 \rightarrow \text{CO}_2\)
3. \(\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2\)
4. \(\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4\text{OH}\)
5. \(\text{NaCl} + \text{NH}_4\text{OH} \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3\)
6. \(2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}\)

**Brine Preparation:** Sodium chloride solutions are occasionally available naturally but are more often obtained by solution mining of salt deposits to give raw, near saturated brine containing low concentrations of impurities such as magnesium and calcium salts. Some brines contain significant quantities of sulfates. Brine purification is required to prevent scaling of processing equipment and contamination of the product. Brine is usually purified by a lime soda treatment where the magnesium is precipitated with \(\text{Ca(OH)}_2\) (milk of lime) and the calcium is precipitated with soda ash. The brine, separated from precipitated impurities, is sent to the ammonia absorbers.

**Ammonia Absorption:** The Purified brine is saturated with ammonia gas in the absorption tower. The ammonia, recycled from various process steps, contains water vapor and carbon dioxide. Small amounts of ammonia are added to make up for losses. During ammoniation, the brine requires cooling (approx 1650 MJ/t or 394 kcal/kg of product soda ash). The absorption operation is generally carried out at atmospheric pressure. The brine descends through the main part of the absorber countercurrent to the rising ammoniacal gases. The temperature of inlet brine is about 30°C and that of exit is about 36° to 42°C.

**Precipitation of Bicarbonate:** The ammoniated brine from the absorber coolers is pumped to the top of one column in a block of columns used to precipitate bicarbonate. This column which has been fouled or partially plugged with sodium bicarbonate after several days of crystallization is referred to as a “cleaning” column. Lime kiln gas, compressed to about 414 kPa (60psi), enters the bottom of the cleaning column and bubbles up through the solution to absorb most of the carbon dioxide. The concentration of carbon dioxide in the liquor is kept below the precipitation concentration. Relatively little cooling is required. The scale is dissolved off the cooling surfaces of the cleaning column by the fresh ammoniated brine, assisted by gas agitation. The liquor leaving this column is fed in parallel to the top of the remaining columns in to block. A stronger carbon dioxide gas made up of a mixture of kiln gas an bicarbonate calciner gas is fed to these crystallizing column and bubbles up through the solution. This process precipitates sodium bicarbonate and is accompanied by the evolution of considerable heat which must be removed to improve yield. Crystals formed during the carbonation step gradually foul the heat – exchange surfaces and thus a crystallizing column must alternately be the “cleaning” column. The gases, which are predominantly nitrogen, but also contain carbon dioxide and ammonia, are vented from the cleaning and making columns and collected of recycling to the absorber.

**Filtration of Bicarbonate:** The slurry, collected from the crystallizing towers, is fed to continuous vacuum filters or centrifuges which separate the crystals from the “filter liquor.” The filter cake is carefully washed with fresh water to control the residual chloride to meet customer specifications. The dewatering characteristics of the bicarbonate crystals are very dependent on operating conditions in the crystallizing columns. Air drawn through the vacuum filter (or the vent gas from the centrifuge operation) is returned to the absorption section. The filter cake, often called “crude bicarbonate” or “ammonia soda”, liquor and is made up of sodium bicarbonate and small amounts (5 mol% on a dry basis) of ammonia primarily in the form of ammonium bicarbonate. The cake is then conveyed to the calcining operation.

**Recovery of Ammonia:** The “filter liquor” contains unreacted sodium chloride and substantially all the ammonia with which the brine was originally saturated, present as “fixed” and “free” ammonia. The “fixed” ammonia or ammonium chloride corresponds stoichiometrically to the sodium bicarbonate that had been precipitated. “Free” ammonia includes ammonium hydroxide, bicarbonate, carbamate, and the several possible carbon compounds of ammonia that decompose at moderate temperatures. Before preheating, sulfide solution may be added for corrosion protection. The sulfide is distilled for eventual absorption by the brine in the absorber. The filter liquor is preheated by indirect contact with the gases leaving the distiller. The warmed feed liquor then enters the main coke-, or bubble cap – filled sections of the distiller where heat decomposes free ammonium compounds and steam strips almost all of the free ammonia and carbon dioxide.

The carbon dioxide – free solution is usually treated with milk of lime (or anhydrous lime) in an external well agitated limiting tank called a “prelimer”. Here the ammonium chloride reacts with the milk of lime and evolved ammonia gas is vented back to the distiller. The resulting hot calcium chloride solution, containing residual ammonia in the form of ammonium hydroxide, flows back to a lower section of the distiller. Low pressure steam sweeps practically
all of the ammonia out of the limed solution. The final solution, known as “distiller waste”, contains calcium chloride, unreacted sodium chloride, and the excess lime, and is diluted by the condensed steam and the water in which the lime was conveyed to the reaction. Distiller waste also contains the inert of this solution. However, the waste liquors are usually pumped to settling basins where the suspended solids are deposited. The clear over flow contains dissolved salts, which are objectionable contaminants are locations where the quality of the receiving waters is materially affected. Close control of the distillation is required to thoroughly strip carbon dioxide to avoid waste o flame and achieve nearly complete ammonia recovery. The hot (900C) mixture of wet ammonia and carbon dioxide leaving the top of the distiller is cooled to remove water vapor before being sent to the absorber.

Lime Preparation: The most suitable limestone, hard and strong with low concentrations of impurities, is graded to reasonably uniform coarse size. Although other fuels may be used, the limestone is usually mixed with about 7% metallurgical – grade coke or anthracite and then burned in vertical shaft kilns. Air is admitted continuously into the bottom of the kiln an gas is sucked off the top. The fuel burns in a zone a little below the middle of the kiln, and the stone “burns” to lime. Carbon dioxide is generated by decomposition of limestone and combustion of carbon in the fuel. The kiln gases are diluted with nitrogen from the air used to burn the fuel and usually stone dust, ash particles, and gaseous impurities. The gas is partially cooled in the kiln by the upper layers of stone, and further cooled and cleaned before entering the compressors feeding the carbonating columns.

The lime, cooled somewhat by the entering air in the lower parts of the shaft kiln is discharged intermittently and usually in rotary slackers that produce a thick suspension, commonly called “milk of lime”, which is stored in agitated tanks. The heat of the reaction produces milk of lime at a temperature of 90-1000C; water addition is controlled to give a free calcium oxide. In some operations, dry lime is used in place of the milk of lime. It is pulverized and added continuously to the prelimer in the distillation step, thus reducing the water added and steam consumption and producing a concentrated distiller waste. Also now a days many soda ash manufacturers are using Dry liming technology instead of Milk of Lime which results in saving of steam.

Calcing the Bicarbonate to Soda Ash: To prevent dilution of the decomposition gases, the crude filtered bicarbonate is continuously calcined by indirect heating. Various techniques are used to heat the material in which is recycled after compression to enrich the makeup kiln-gas feed to the carbonation operation. The hot soda ash discharged from the calciner is cooled, screened, and packaged or shipped in bulk. This product, called “light ash” because of its low bulk density, is converted to dense ash.

By-Products:
Calcium Chloride: Relatively few synthetic soda ash plants recover calcium chloride, and most of those that do utilize only a small part of the total amount available in the distiller waste. To produce calcium chloride, the distiller waste liquor is settled and then evaporated in multiple – effect evaporators. During concentration most of the sodium chloride separates. The remaining solution is further concentrated to the equivalent of CaCl2.2H2O. this solution is cooled, forming flakes which are dried in a rotary dryer, giving a product sold as 77-80% calcium chloride. A small amount is processed to the anhydrous state. Calcium chloride is used on unpaved roads as a dust abater and as a deicer on highways in winter. It is used for freeze proofing and dust proofing coal and coke, in refrigeration brines, as a drying agent, and in cement products.

Advantages of Solvay process:
• Can use low-grade brine
• Less electric power
• Less corrosion problems
• Does not require ammonia plant investment

Disadvantages of Solvay process:
• Higher salt consumption
• Higher investment.
• Waste disposal.
• More steam consumption
• Higher capacity plant for economic break-even operation

Natural Processes
Apart from synthetic processes, soda ash can also be produced from natural soda reserves and production from lake waters. Natural soda ash containing brines and deposits were found in the United States at Searles Lake, Califonia and Green River, Wyoming in the late 1800s. During the first half of the 1900s the Searles Lake deposit was commercialized and the production facilities improved and expanded. In 1938 large deposits of trona, Na2CO3. NaHCO3.2H2O were found in the Green River basin . Deposits of sodium carbonate are found in large quantities in Botswana, China, Egypt, India, Kenya, Mexico, Peru, Turkey, and the USA.

The major natural sodium carbonate deposits include trona from Green River, Wyoming, USA (operated by FMC Industrial Chemicals, General Chemical Industrial Products Inc., OCI Chemical Corp. and Solvay Chemicals Inc.), brine from Searles lake, California, USA (Searles Valley Minerals Inc.), brines from Lake Magadi, Kenya (Magadi Soda Co., a wholly owned subsidiary of Brunner Mond, which has been bought by Tata Chemicals Ltd, India) and brines from Sua pan in Botswana (Botswana Ash or Botash).

3. Trona Based Process
All processes are based on ore treatment from which impurities (i.e. organics and insolubles) have to be stored underground or in tailing ponds.
Trona
Trona is a relatively rare, non-metallic mineral. The pure trona material contains 70.39% of sodium carbonate. Because trona is an impure sodium sesquicarbonate mineral (Na2CO3·NaHCO3·2H2O), it has to be processed by calcinations of the excess carbon dioxide and removing water to produce soda ash.

Trona minerals can be found underground (Green River trona deposit in Wyoming - USA, Inner Mongolia - China, Henan - China) or in dry lakes (Searles Lake trona brine deposit in California – USA, Magadi Lake trona brine deposit in Kenya, Sua Pan trona brine deposit in Botswana).

Underground "dry" trona processing consists in several steps:
- mechanical mining by the “room and pillar” or “long wall” method
- As trona is an impure sodium sesquicarbonate mineral (Na2CO3·NaHCO3·2H2O), it has firstly to be calcined to produce soda ash still containing all the impurities from the ore
- Next, calcined trona is dissolved, the solution is settled and filtered to remove impurities (insolubles and organics)
- The purified liquor is sent to evaporators where sodium monohydrate crystals precipitate
- The monohydrate slurry is concentrated in centrifuges before drying and transformation into dense soda ash

Deposits from trona lakes and solution mined trona are processed as follows:
- Dissolving trona in wells
- Carbonation of the solution in order to precipitate sodium bicarbonate
- Filtration of the slurry
- Calcination of the bicarbonate to get “light soda ash”, recycling of the carbon
- Carbon dioxide to the carbonation
- “Light Soda Ash” transformation into “Dense” by the “monohydrate method”
- Carbon dioxide make-up produced by burner off-gas enrichment

4. Dual process
In this process ammonium chloride is produced as a co product in equivalent quantities and differs from conventional solvay process and it does not recycle ammonia.

Process description: The mother liquor from the carbonating system, containing ammonium chloride, untreated salt and traces of carbonate is ammoniated in ammonia absorber. The ammoniated mother liquor is passed through a bed of salt in a salt dissolver. Exit liquor from the dissolver, saturated with salt, is gradually cooled from 400 C to 100 C by evaporation under vacuum to separate ammonium chloride. The slurry containing ammonium chloride is centrifuged and dried. The product is 98% pure and is marked as ammonium chloride fertilizer with nitrogen content of 25%.

The mother liquor obtained after the separation of ammonium chloride crystals is recycled to the carbonation vessels placed in series. Carbon dioxide obtained from ammonia plant and the calciner section of soda ash plant is injected in the carbonation vessels. There is provision of cooling coils in the lower carbonation vessels. Sodium bicarbonate is formed. The growth of crystals, of sodium bicarbonate is controlled by the supply of cooling water to cooling water to cooling coils in carbonation vessels. Sodium bicarbonate is thickened in a thickener and centrifuged. The sodium bi carbonate is calcined to soda ash.

Raw material consumption per ton of co-product:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>1.3 tons</td>
</tr>
<tr>
<td>Ammonia</td>
<td>335 kgs</td>
</tr>
<tr>
<td>Power</td>
<td>250 kwh</td>
</tr>
<tr>
<td>Fuel oil</td>
<td>18 litres</td>
</tr>
</tbody>
</table>

The plant has several advantages over the conventional Solvay process in as much as it uses less raw material, has no effluent disposal problem, and both sodium and chloride radical of salt are fully utilized giving valuable ammonium as a byproduct. The “dual process”, which allows production units to co-produce in nearly equal quantities ammonium chloride, which is used as a fertilizer in rice cultivation. There are several plants in the world which are working with that process. Most are situated in China.

5. Nahcolite
A Nahcolite deposit has been found in Piceance Creek in Colorado-USA and an industrial soda ash plant has been put into operation at the end of the year 2000. Little practical experience of this process is therefore available.

Nahcolite is processed as follows:
- By solution mining (wells, with injection of hot mother liquor returned from the surface facilities)
- As nahcolite is an impure sodium bicarbonate mineral (NaHCO3), it must be treated
- The hot solution is decarbonated by heating
- The solution is sent to settling and filtration.
- Next, the purified liquor is sent to evaporators where sodium monohydrate precipitates
- The slurry is concentrated by centrifugation and the monohydrate crystals transformed to soda ash by drying
- The mother liquor is sent back to the solution mining

6. Nepheline Syenite Process
There is still a process operated in Russia, mainly in a plant situated in Siberia, which uses mixed minerals and allows the coproduction of alumina, cement and soda ash. The soda ash produced is of poor quality.
The system is based on the premise that the producers are required to provide financial incentive to the collection, processing facilities and recycling industry to meet the targets of government. Local body will seek assistance of producers for setting up the system. For the overall implementation of the EPR framework, producers/importers/Brand Owner should be involved in overall implementation of projects, and not only collection. All stakeholders should register themselves on the portal; the online portal is envisaged to resolve the issues of registration of the stakeholder. For the ease of implementation in every town, different EPR models are proposed. As any single EPR model may not be suitable to be implemented in the country.

Model 1 - Fee based model
This framework addresses three components: ULBs (Urban Local Body), Plastic assembler/recycler and rag pickers, IEC (Information, education and communication) activity. In this model, the primary responsibility of the collection/segregation and disposal of the plastic waste is with the ULBs. Plastic assembler/recycler, rag-pickers and IEC activity should be supported for the better and effective waste management. Priority shall be given to Waste collector/assembler and recyclers. Need to formalize & strengthen the informal sector. Producers/importer/brand owner (who are using less quantity of plastic for packaging) shall contribute to the EPR corpus fund. The amount to be contributed will be decided based on normative cost. EPR funding will be provided to 3 entities (ULB, Plastic assembler/recycler, IEC activities). For monitoring overall implementation, a committee will be constituted at central level. State Level Advisory Boards (SLABs) engaged to manage the process of recommending the disbursement of funds.

Model 2 - PRO based model and Plastic Credit Model
In this model, the objective is to establish a PRO (Producer responsibility organization) to lead on implementation and provide funding required under the rules on behalf of
producers/importers/BO to support plastic recycling and promoting the ease of doing business for all stakeholders. In this model, the industry self-managed PRO need to take on the responsibility for discharging producer’s national and state legal obligations. Producers will be at liberty to decide options for establishing channels of collecting plastic credits with or without linking with PROs. The producer/importer/brand owner by the collect back/buy back mechanism may collect the plastic waste and directly take credit from the recycler.

**Product take-back mandate and recycling rate targets**, this policy approach mandates that manufacturers and/or retailers individually or collectively as a consortium take back products at the end of the products’ useful lives. Combined with such mandates is some kind of recycling or waste diversion target.

**Product take-back mandate and recycling rate targets, with a tradable recycling credit scheme**. This approach is the same as above but instead of each individual producer meeting the same target, tradable credits are issued and firms are allowed to trade among themselves.

**Voluntary product take-back with recycling rate targets** – The firms agree to organize a take-back system for their products and set recycling goals. There is no law or government regulation mandating compliance and no penalties for not meeting the goals.

**Producer Responsibility Organizations (PROs)**

Producer can join a PRO to fulfill their complete operational responsibility for acquiring plastic credits. PRO will carry out the legal requirements on behalf of their member companies. However, the final responsibility of providing final evidence of reprocessing/export of plastic packaging rests with the producer. Based on the experience, PRO registration is divided into 3-4 groups. EPR targets will be decided upon the information provided by BO/ importers regarding total number of states where they are operational, quality and quantity of plastics etc. Guiding principles are mentioned in the document. The involvement of the PRO and their access in any particular ULB shall depend on the various factors. However, there are certain guiding principles which are fixed such as ULB have lead responsibility to set up and maintain collection/segregation/sorting system and should share the costs of these programs with PRO etc. All obligated PIBOs (Producer, Importers and Brand Owners) should provide all the required information on online web portal, manufacturers and PIBOs shall submit quarterly report online into the portal against their targets. CPCB shall create a national level association named PRO Association (PROA). All the registered PROs shall be the members of PROA.

**Audit and Certification** - There shall be Certifying Agency who would certify every quantity of waste recycled/disposed by the recycler, eligibility of funding would be based on the issued certificate. A full proof mechanism is ensured to avoid duplicity of certificate.

**PRO Funding Mechanism** – Being a critical issue for obligated producers in the design and operation of the PRO, it should be determined through consultation with affected companies. However, based on other global practises, per kilogram fee rate for each specific plastic is suggested, the methodology for determining the fee rates and the allocation should be determined by PRO, the per kg fee shall be calculated considering all aspects.

**Targets** - The targets for EPR compliance shall be based on the model selected by each PIBO. A graded approach for achieving the targets is recommended, starting with 30% and moving up to 90% in a period of 5 years. It has been proposed that plastic waste collection and recovery targets be set for a single consolidated recycling and recovery target for all obligated plastic packaging types (to be determined through industry consultation)

**Guiding principles for uniform EPR Framework were described.**

It includes-- Uniform EPR Framework is brand and geography neutral, PIBO can adopt any or all the EPR models at the same time (except fee based model). A single national registry for registration of all stakeholders, ownership of portals and digital exchange should rest with the Government to ensure protection and confidentiality of members’ data. Manufacturers and PIBOs will procure a digital certificate from the PRO. Penalties shall be imposed on the PIBO if the EPR targets aren’t fulfilled etc.

**Monitoring Mechanism** - The monitoring of the entire mechanism of the EPR shall be the responsibility of CPCB. A six monthly report shall be generated by CPCB and shall be submitted to the Ministry.

To view, Complete ‘Guideline Document - Uniform Framework for Extended Producers Responsibility’, please click on the below link:
The Occupational Safety, Health and Working Conditions Code, 2019

Ms. Priyakanchini Gupta, Manager – EHS at GHCL Ltd

**Applicability:** The Code seeks to regulate health and safety conditions of workers in establishments with 10 or more workers, and in all mines and docks.

**Purpose:** With regard to health, safety and working conditions, the Commission noted that there are several laws governing health and safety of workers. It recommended the consolidation of these laws into two codes; one universally applicable law to ensure safety at the workplace, and another law containing minimum standards of working conditions, work hours and leaves. In this context, the Occupational Safety, Health and Working Conditions Code, 2019 was introduced in Lok Sabha by the Minister of Labour and Employment, Mr. Santosh Kumar Gangwar, on July 23, 2019. Following this, it was referred to the Standing Committee on Labour and Employment, on October 9, 2019. The Code seeks to regulate health and safety conditions of workers in establishments with 10 or more workers, and in all mines and docks. It subsumes and replaces 13 existing labour laws relating to safety, health and working conditions.


<table>
<thead>
<tr>
<th>Features</th>
<th>Existing Laws</th>
<th>2019 Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coverage and registration</strong></td>
<td>Different Acts cover establishments based on various thresholds of workers. Further, some Acts require establishments to obtain registrations or licenses. These include Acts covering factories (threshold: 10 workers with power and 20 without power), motor transport workers (threshold: 5 or more workers), contract labour (threshold: 20 or more contract labour).</td>
<td>The Code applies to establishments employing 10 workers or more, and all mines and docks. Establishments covered by the Code are required to register. Factories will need an additional license. Contractors hiring 20 or more workers may obtain a license of 5 years. For beedi workers, license validity is extended from 1 year to 3 years.</td>
</tr>
<tr>
<td><strong>Authorities</strong></td>
<td>Inspectors can carry out surprise checks, and inquire into accidents, among other powers. Mines, building and construction workers, dock workers, contract labour: Advisory committees/boards may be constituted to advise government on matters under the Act.</td>
<td>Inspectors-cum-facilitators can carry out inspections, and inquire into accidents. Occupational Safety and Health Advisory Boards will be set up at the national and state level to advise central and state governments on framing of rules and regulations.</td>
</tr>
<tr>
<td><strong>Duties</strong></td>
<td>Factories Act: Employers must ensure safety in handling, storage and transport of hazardous articles, and provide instruction and training to ensure the health and safety of all workers. Inter-state migrant workmen: Contractor is required to furnish details of migrant workmen to authorities, issue them a pass-book, and report to the authorities in case of accidents. Contract Labour: Contractor to provide welfare facilities.</td>
<td>The duties of employers include: (i) providing a workplace that is free from hazards that may cause injury or diseases, and (ii) issuing appointment letters to employees. Additional duties of employers in factories, mines, docks, plantations, and building and construction work, include: (i) providing a risk-free workplace, and (ii) training of employees. Contract Labour: Employer to provide welfare facilities.</td>
</tr>
</tbody>
</table>
**Work hours and leave**

- **Factories, mines, and beedi and cigar workers:** No worker can work for more than 6 days a week. Maximum work hours are 48 hours/week, or 9 hours/day (8 hours for underground mines). Further, workers are entitled to receive paid annual leave for at least one in 20 days spent on duty. Overtime work will be eligible for twice the wage.

- **Working journalists:** Cannot work for more than 144 hours in four weeks. Sales promotion employees are entitled to earned leave for 1/11th of time on duty, and medical leave (of 50% wages) for 1/18th of time on duty.

**Health and welfare facilities**

- **Mines, plantations, and building workers:** Provisions for drinking water, toilets, and first aid.
- **Beedi and cigar workers:** Provisions for ventilation, overcrowding, canteens and creches.
- **Plantation and building workers:** Provisions for canteens, creches, and housing facilities.

**Special provisions**

- **Factories:** Women may work between 6am and 7pm only in plantations, beedi and cigar establishments, factories, and mines (women may not work underground in mines).

**Offences and Penalties**

- **Factories, motor transport undertakings, beedi and cigar factories, contract labour, and inter-state migrant workers:** Offences include: (i) obstructing an inspector in discharge of his duty; and (ii) violating conditions of employment. Penalties vary between imprisonments of one month to two years along with fines between one hundred rupees to five thousand rupees.

**Major changes:**

a. Clause 22 giving discretionary power to the government to set up Safety Committee, while this is a statutory requirement for every hazardous unit under the Factories Act of 1948.

b. Clause 83 giving state governments power to "prescribe" maximum permissible limits of workers' exposure to chemical and toxic substances, while the 'second schedule' of the Factories Act of 1948 specifies this and,

c. Clause 125 and 126 giving extensive powers to governments to make rules for implementing the Code, including those relating to health and safety matters.

It proposes "one registration" for all establishments (with 10 or more workers) and provides for a National Occupational Safety and Health Advisory Board to recommend policy matters to the central government and State Occupational Safety and Health Advisory Boards to advise states on administration issues arising out of the Code.

It empowers the government to constitute Safety Committee in an establishment or a class of establishments. It allows women to work at night, from 7 pm to 6 am, subject to safety conditions and their consent.

The other features include a 'common license' for factory, contract labour and beedi and cigar establishments and introduction of a single all-India license for five years for engaging contract labour.
Recently the Indian chemical industry has been beset by a string of fatal incidents, all of them occurring when the plants were in the process of starting up after several weeks of lockdown. What can we learn from these incidents? Are there any lessons to be learned to avoid similar occurrences in the future?

**Transient Process**

These spates of incidents were not entirely unexpected. Starting up and shutting down a chemical plant has always been fraught with risk. Even with a template in place, the operators have to always expect the unexpected. Systems often don’t respond the way we would want them to and this can be very crucial in the transient process of startup and shut-down. Equipment and hardware which are at the end of their useful life can fail catastrophically during start-up. It is the period that requires the utmost attention and concentration of the human mind. Every start-up and shut-down presents unique challenges for the human mind.

**Incidents**

On 7th May, Styrene vapors leaked from a polymer plant in Visakhapatnam. It left 11 people dead; nearly 1000 people had to be evacuated. While this incident grabbed nationwide media attention because of the fatalities, other incidents that happened around this time evinced little interest. On the same day, 7 workers were injured in a power plant boiler explosion at Neyveli, near Cuddalore. Just hours before the Styrene leak, 7 workers inhaled some toxic gas in a paper mill, which was being readied for resuming operations after a protracted shutdown. Also on the same day, there was a fire in the packaging section of a pharmaceutical plant near Nashik. A couple of weeks later, there was a major fire in a chemical plant handling ethanol and acetone near Pune. And soon after, 10 people were killed in a major explosion in a plant at Dahej in Gujarat. At the time of writing this, a gas leak has killed the General Manager of a plant in Kurnool district. And just as were going to press comes the news of yet another incident, again in Andhra Pradesh, on the outskirts of Visakhapatnam, where benzimidazole gas leaked from a pharma unit. Two people died and four have been hospitalised.

**Human Error**

The fact that these incidents happened in close succession immediately after the relaxation of lockdown leads to the suspicion that the pandemic in some way or the other must have been responsible. These are extraordinary times for all of us. It cannot be denied that the pandemic has scarred our minds to varying degrees. While some people have been preoccupied with the security of their jobs and livelihood, others have been worried about the wellbeing of their near and dear ones. That these are stressful times would be an understatement. This series of incidents beg the question about the preparedness of the staff involved. Trevor Kletz, the grandfather of Process Safety, has famously said – All error is human error as people have to decide what to do; people have to decide how to do it; people have to do it. But he went on to add that blaming human error diverts attention from what can be done by better engineering. Prof James Reason eloquently summed this up – we can- not change the human condition, but we can change the conditions under which people work.
NDMA Guidelines

After the Styrene leak, National Disaster Management Authority (NDMA) has come out with a set of guidelines for restarting factories after the lockdown. The guidelines suggest that the first week after restart should be considered as a trial or test run during which companies should not aggressively ramp up production. Employees should be sensitized to identify abnormalities like sounds, smells, vibrations, leaks etc. Most of the recommendations of NDMA are routine and would figure in the SOPs of major chemical companies, yet may not be in the playbook of some companies in the growing MSME sector. The guidelines call for a safety audit before the restart of the plant.

ICHEM Good Practices

UK based IChemE has recently published a collection of good practices that will help businesses manage the extraordinary situation created by the COVID-19 pandemic.

Top on the list is mental health. The guidelines warn that the current situation can adversely affect the mental health of its staff, either because of social isolation and loneliness or due to stress. Organizations should be aware of this and should develop programs that will promote the wellbeing and mental health of its employees. The white paper advocates that the management should “try to show a little less judgment about how others are acting and a bit more compassion for their circumstances, some of which we may not understand”.

CCPS Resources

US-based Centre for Chemical Process Safety (CCPS) has published 2 monographs giving helpful pointers on the unprecedented situation created by the COVID-19 pandemic. These monographs are freely available on their website. One contributor in the monographs interestingly draws a parallel between the present situation and the 2005 explosion at BP Texas City Refinery which was then operating with much-reduced staffing levels. Another parallel is in the 1998 Longford Esso incident, where the technical staff worked remotely from the plant site. The change in work culture and ethics due to some people working remotely from home needs to be fully understood. CCPS recommends “Activity mapping” to make sure that all tasks are fully covered in the event of understaffing.

Workplace Changes

The White Paper of IChemE has recommended some drastic changes for the shop floor to make sure the safety of the employees. Teams should be broken up into subgroups, so that one subgroup does not contaminate the other in the event of a fresh outbreak. Adequate backups should be ensured for critical roles. The entire shift should be segregated to avoid chances of cross-spreading. Physical distancing has to be observed while handing over shift. Workstations have to be regularly sanitized, while ensuring that the process integrity is not inadvertently altered and compromised. These practices could become permanent if the pandemic lingers on indefinitely.

Safety Science

It is a tragic fact that the science of safety advances mostly through hindsight. Each fatal incident, each near-miss, teaches us new lessons and adds incrementally to our knowledge. The Flixborough disaster of 1974 hastened the adoption of Hazop Studies and introduced the concept of Change Management. The Bhopal Tragedy of 1984 led to the Responsible Care movement. Following the attack on the World Trade Centre, businesses got alerted to the threat of terrorism and started preparing to counter it. The earthquake and tsunami at Fukushima in 2011 is another recent example. Even as recently as 2017, Hurricane Harvey taught us new lessons of how to respond in the face of an unprecedented deluge. The COVID-19 pandemic is another such “Black Swan” event which is making the industry introspect about their safety practices and test their robustness.

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INTRODUCTION:
The embodiment of corrosion control into the design of an equipment can be achieved most efficiently by captivating this control within its geometry, i.e. in its three dimensional form, its layout and its relative and spatial position. There is no other design effort which can assist so much in prevention of corrosion for such a comparatively small outlay. Whereas basically the pattern of a utility depends on its functional, material and fabrication requirements, it is within the scope of a good designer to select from the available possibilities only such geometric shapes that help to reduce corrosion attack in the most efficient and economic manner.

The guidelines for selecting proper geometry of the structures and equipment, piping systems, tanks and vessels, heat exchangers, and electrical and electronic appliances, etc., are described as follows:

STRUCTURES AND EQUIPMENT:
The geometrical design guidelines for structures and equipment are given below with illustrations for better understanding:

- Avoid traps accumulating liquids and absorbent solid wastes, etc., which cannot be drained. Figure-1 top shows bad geometry as it provides fluid/solid entrapment site and formation of concentration cell. The bottom left of the figure shows provision of a drain hole through which the fluid/contaminants can be drained out and hence a better design. Bottom right shows that double continuous fillet weld is preferable for preventing corrosion. Adequate drainage-scuppers and limber holes should be provided at the lowest possible position in a space to ensure full drainage of space. Self-draining structures should preferably be designed.

- Avoid small enclosures within the structural frame. If not avoidable, provide for removal of moisture or other corrosive media from critical spaces and for their speedy drying. Silica gel can be kept in the void beneath the equipment for removing moisture and may be renewed as needed from time-to-time as shown in Figure-2.

- Prevent access of abrasives and other solid contaminants to critical spaces. Figure-3 shows three methods for preventing solid contaminants. Top left shows use of mesh filter for separating solid particles from the fluid. Top right shows the process of settling solid particles by dipping the input pipe up to the bottom of the settling tank and output is taken from the top surface of the tank. The bottom of the figure shows provision of plugs in the filter so that the solid particles can be separated at regular intervals by opening the plugs. Similarly, condensation of vapours should be prevented in critical spaces by selecting proper geometry of the surfaces.

- Every effort should be made to design a shape or form which will reduce the effect of excessive velocity, turbulence of flow and formation of gas bubbles. Figure-4 shows the geometries not preferable.
in the design of equipment. 4a-indicates effect of projection, 4b-shows the effect of groove or crevice, 4c-indicates the effect of corner. Also avoid forms which aggravate rapid surging of fluid flow.

- Avoid gaskets overlapping on the inside and the outside of the equipment or structure. Figure-5 shows bad, better, and best designs from left to right of the figure respectively. It can be seen that O-ring seal is better than gasket in preventing corrosion.

- Pipes may be secured by mounting them on sponson plates rather than supporting them on number of brackets separated from each other as shown in Figure-6.

- Arrange the layout of the equipment/structure for an easy initial preservation and repair work. Make surfaces of connections accessible for easy cleaning and maintenance. Similarly replaceable impingement plates and baffles should be provided so that they can be replaced easily (better maintainability). Access of oxygen to equipment/structure must be made by selecting appropriate geometry, if they are made up of active metals.

- Shape propellers or impellers to avoid high turbulence formation and reduce low pressure build-up at the tips of the impeller blades.

- Sufficient concrete cover should be provided for steel reinforcement in aggressive environments to prevent corrosion of embedded steel. The arrangement of reinforcement in reinforced concrete should be determined not only by structural requirements but also by relevant corrosion-control considerations.

**PIPING SYSTEMS:**

The geometrical aspects for corrosion control in pipelines are given as below:

- Provide for removal of rust, debris, solid contaminants, and water/moisture, lubricating oil, steam, etc., entrained or formed on streams, from the system. Care should be taken to remove liquids from compressed air, gas and steam lines. Similarly, provide for removal of entrained air and gases from the liquids in piping systems.

- Keep number of joints and bends to a minimum and avoid unnecessary runs of pipelines. Streamline the interiors of the piping systems for easy drainage. Avoid stagnancy producing stubs and dead ends. Slope all pipelines continuously downstream to their outlets and provide drainage in dipped sections of the pipe.

- Avoid turbulence, rapid surging, excessive agitation and impingement of fluids in the piping system. Use turbulence forming components such as: throttle valves, orifices, etc., only when absolutely necessary. Select components which present lesser resistance to flow. Straight through type of valves such as: gate, butterfly and plug valves should be used in preference to throttling globe and angle valves. A ventury tube will be preferably to an orifice plate for preventing turbulence and impingement of fluids. Flow rate should be controlled at the outlet rather than the inlet of a component prone to impingement as shown in Figure-7.

- Avoid using orifices in the close proximity of bends. Figure-8, left side shows improper location of orifice causing impingement. If orifice plates are unavoidable, at least two plates should be used and the distance between the plates should be mismatched. There should be a minimum distance of two pipe diameters between orifice plates. The upstream side of the orifice should be chamfered. Any sudden change like sharp bend should be avoided in the direction of fluids in pipelines, especially in those made of lead, copper and their alloys. Figure-9 left depicts bad design showing sharp bend and installation of right-angle valve in the pipeline, whereas a smooth bend and installation of a gate valve indicating a better design is shown in the right side of the figure.

- Avoid surging of fluids in the pipeline by: tapering the transition from
one bore to the other; arranging for complete filling of pipeline if possible; equalizing pressure differences in the pipeline; and shaping any part, such as discharge side of turbines, suction side of pump impellers and discharge side of regulating valves, for avoidance of low pressure and high turbulence build-up.

- The bend radii of pipes should be as large as possible. Normally, a minimum of three times the diameter of the pipe should be enforced for economic velocities. This may be adjusted up for various metals, depending on their fabrication difficulties, e.g. mild steel and copper pipe three times, 90/10 copper-nickel four times, etc. Figure-10 left side shows right angle bend leading to impingement of fluid, hence a poor design. Whereas right side shows preferred design showing bend radius of three times the diameter of the pipe.

- Avoid branching off in tees on high velocity connections as shown in Figure-11 left side. Lateral branching off in tees as shown in the right side of the figure should be preferred.

- Select take-down joints with minimum misalignment—if possible self aligning joints should be used. Maximum misalignment should not exceed 0.006 in (152µm). Flanges, fittings and gaskets should be used with equal inside diameter (gasket internal diameter should be same as the pipe bore diameter). Rate of impingement is equal to the square of maximum joint error in alignment.

HEAT EXCHANGERS:

The guide lines for heat exchangers, coolers, heaters, condensers, etc are described below:

- Welding of tubes in tube sheets should be preferred to the rolling-in system.
- Extend the tubes beyond the tube sheets for avoiding erosion of the tubes at fluid entry/inlet ends. Ferrules made of same metal as that of tubes may be inserted into the inlet ends of condenser tubes and the ferrules may be feathered for avoiding steps.
- Cooling water starvation at the periphery of the tube bundle should be avoided by selecting proper geometry/layout of the water box and tubes. Figure-12 left side shows rectangular water box and layout of tubes leading to failure on periphery-bad design, whereas the right side shows rounded water box and proper layout of tubes-a better design. Equal fluid velocity should be secured through all the tubes in the heat exchangers.

- When discharging directly to the atmosphere, discharge should not impinge on other piping or equipment. The heat exchanger tubes should preferably be slightly slanted so that proper draining can be achieved.

- Occurrence of hot spots should be avoided by making proper arrangement for holding the hot tubes. Figure-13 left shows formation of hot spot due to the contact of the hot tube with the cold holding structure, whereas the right side shows use of asbestos to insulate the hot tube to prevent formation of hot spot and corrosion.

TANKS AND VESSELS:

The geometrical aspects of design for tanks and vessels for corrosion prevention are listed below with illustrations:

- Un-drainable horizontal flat tank tops should be avoided. Appropriate drainage must be provided for preventing corrosion, as shown in Figure-14. Welded tanks are preferable to those riveted or bolted as fasteners provide sites for crevice corrosion.
- The interior of fluid containers must be streamlined for easy
and complete cleaning. The tank bottoms should be sloped towards drain holes to prevent collection of liquids after emptying tanks and vessels. Figure-15 top-left illustrates poor design of the tank bottoms as fluid gets entrapped at the bottom. Subsequent evaporation of the fluid may result in increased concentration of corrodant leading to pitting of the tank bottom. Top-right shows good design of the tank bottom facilitating complete drainage of the fluid, preventing premature pitting of the tank bottom. Bottom-left of the figure shows sloping of the tank and correct location of the drain pipe for complete removal of the fluid. The bottom-right shows good and bad design of the outlet pipe for draining the tank.

- Inlet pipe to a vessel should be directed towards the centre of the vessel so that minimum splashing of liquid takes place during filling the vessel, as shown in right side of Figure-16. The inlet pipe should be protruded deep into the centre of the vessel and an air pipe or safety valve should be provided as shown in the figure. The left side of the figure shows a poor design as splashing of liquid will cause precipitation ofcorrodants on the walls of the vessel. Also in-tank protrusions of side inlets and outlets should be avoided as shown in Figure-17 (left side shows poor design vs right side showing better design). The protruded pipes may cause turbulence in the fluid.

- Crevice between the tank-seating and the tank base should be prevented for avoiding crevice corrosion by selecting proper installation/geometry. The tank should not be kept on uneven concrete slab. The tank may be raised from the base to prevent formation of crevice. However, it will be a good idea to keep silica gel in the void space.

- Haphazard insulation on the tank should be avoided so that moisture does not get entrapped in the insulation. The tank should be sealed if it contains hygroscopic corrodant so that it does not breathe damp air. Also avoid conditions allowing absolute pressure to drop below the vapour pressure of the liquid contained in the tank by considering adequate geometry.

- Replaceable impingement plates and baffles should be provided wherever necessary as depicted in Figure-18. The left side of the figure shows installation of a replaceable impingement plate for preventing damage of the tank from high pressure steam supply. The right side of the figure shows installation of baffles for stopping direct impingement of the tank bottom.

- Partially filled reaction vessels and storage tanks containing vapours of corrosive solutions should either be vented to the atmosphere or provided with vacuum removal of vapour or with a condenser return to the vessel. The filling of concentrated solutions into the tank for dilution purposes should not be done along the side walls of the tank, instead it should be fed into the tank from the top central position of the tank through a pipe dipped deep into the tank.

Fig-14: Tank roof top geometrical design showing provision of drainage and complete cleaning. The tank bottoms should be sloped towards drain holes to prevent collection of liquids after emptying tanks and vessels. Figure-15 top-left illustrates poor design of the tank bottoms as fluid gets entrapped at the bottom. Subsequent evaporation of the fluid may result in increased concentration of corrodant leading to pitting of the tank bottom. Top-right shows good design of the tank bottom facilitating complete drainage of the fluid, preventing premature pitting of the tank bottom. Bottom-left of the figure shows sloping of the tank and correct location of the drain pipe for complete removal of the fluid. The bottom-right shows good and bad design of the outlet pipe for draining the tank.

Fig-15: Top left showing bad geometry, top right showing good geometry, bottom left showing good design & right shows bad & good outlet pipe design

Fig-16: Splashing of liquid (left) is poor design vs minimum splashing (right)

Fig-17: Protrusion of inlet/outlet pipes into the tank (left) vs flushed pipes showing poor and preferred designs respectively

Fig-18: Provision of renewable impingement plate (left) and baffles to prevent tank bottom from impingement (right)
ELECTRICAL AND ELECTRONIC EQUIPMENT:
The following aspects should be looked into while designing the geometry of electrical and electronic parts:
• Suitable parts of the equipment should be grouped together for an easy and foolproof encapsulation, sealing or enveloping. Avoid inside and outside pockets, welds, traps and sump areas where water and condensed moisture could collect. Provide drainage paths for extraction of contaminants and condensed moisture away from the critical areas.
• Design the interior layout for an easy and efficient ventilation, drying and extraction of humidity and contaminants. The effect of interior heat generation should also be considered.
• Site the equipment away from the currents (ventilation blowers) collecting and carrying contaminants and excessive humidity; also away from excessive heat generators (temperature should not be more than 50°C, unless especially provided for).
• Continuous and impervious joints should be provided. All crevices should be sealed including washers, threaded fasteners and resistance welded joints, etc.
• Spacing should be kept between conductors of different voltage potentials as wide as possible to avoid electrolysis and migration of silver.
• Grounding of equipment should be expertly engineered to avoid adverse galvanic and stray current effect on the structure and the pipe system.
• Cable layout should be planned to avoid corrosive areas or encased in corrosion proof conduits.
• The effect of welding, brazing and soldering temperatures on adjoining materials in the equipment should dictate selection of the jointing design.

CONCLUSION:
It can be concluded from the above deliberations that corrosion prevention must start at the blackboard, at the design stage. A good design at the blackboard is no more costly than a bad design, a bad design is always more expensive than a good design in reality. Technical design, considering aspects such as geometric shapes or combinations of forms, layout and the relative spatial position of the components will help to reduce corrosion most economically. Such design configuration has a critical role to play in the service life of components/equipment. More often, more attention is paid to the selection of corrosion resistant materials for a specific environment, and a minimal consideration is given to design aspects discussed above, which leads to premature equipment failures.
Meghmani Finechem Limited (MFL), a flagship company of Meghmani Group, has completed the installation of an integrated Hydrogen peroxide plant in its existing Chloroalkali and derivative complex at Dahej. The project is for value addition of the Hydrogen Gas and the project will utilize the Hydrogen Gas from its own integrated Chloroalkali complex. The plant has a capacity of 60,000 tons per year of hydrogen peroxide at 50% concentration. Total cost of the project is ₹180 Cr with expected revenue of ₹160 Cr per annum in FY 2022 for a fully operational plant.

The present production capacity of the country is not adequate to meet the domestic requirement and balance supply gap is being fulfilled from imports. This plant will cater various industries like textile bleaching, paper & pulp bleaching, water and effluent treatment, non-edible oil refining, chemical synthesis, sugar bleaching and metallurgy industry. In addition, the company will also focus on other industries such as organic peroxides, Pharmaceuticals and Cosmetics. Use in textile & paper bleaching and purification of water are giving a push to the Industrial Hydrogen Peroxide market. Thus Meghmani Finechem Ltd. will bring its Hydrogen Peroxide business to a significantly higher level within these fast-growing markets and consolidate its position as one of the largest Chloroalkali and Derivatives complex in India.

The plant production process will be based on the latest state-of-the-art technology. With this commission, integrated MFL complex is expected to reach the total revenue of ₹2000 Cr per month by FY 2023 with key contributions from existing Caustic Chlorine, Potash and Derivatives such as Chloromethane, Hydrogen Peroxide, Epichlorohydrin (ECH) and Chlorinated polyvinyl chloride (CPVC resin). The new upcoming projects Epichlorohydrin and CPVC resin are expected to be commissioned on FY 2022 and FY 2023 respectively.
Transform Indian Chemical Sector from Trade Deficit to Trade Surplus by 2030

The Chemical Industry which covers more than 80,000 commercial products has been an integral part of the global economic landscape. The Chemical Sector in India was valued at $125 billion in sales and $147 billion in terms of consumption in 2018. However, the Indian market is very small in the global context. India only contributes ~ 3% of the Global Chemical industry, which is valued at $4.1 trillion. In comparison, the Chinese Chemical Market Size is $1.45 trillion which is ~40% of the Global Market. In 2018, the export performance of the Domestic Chemical Industry was $34 billion against imports of $56 billion (38.1% of total consumption) registering a net trade deficit of $22 billion.

The Indian Intermediate and Specialty Chemical (I&SC) Sector

The I&SC Sectors, primarily operated by the MSME sector and a few large companies, provide vital products to key downstream industries like agriculture, automobiles, textiles, paints, paper, soaps and detergents, pharmaceuticals, rubber, etc. The products are either manufactured in large dedicated plants or are produced in a batch or continuous multipurpose plants. This is a highly knowledge-intensive industry with key emphasis on Quality, Safety, Health & Environment (QSHE) and Skilled Manpower. In 2018, I&SC sector alone had exports of $28.2 billion against Imports of $44.5 billion leading to a net trade deficit of $16.3 billion. The Indian Potential for growth in I&SC sector remains untapped and with special government focus, the I&SC sector can transition from being a net importer to becoming a net exporter.

India as an alternative sourcing destination to China

Easternization: Over the past 2 decades, in a bid to remain competitive, several chemical companies from the West outsourced manufacturing to low-cost foreign destinations, leading to the Easternization of the Sector. China and India were the primary beneficiaries of this shift in global chemical production. This occurred due to a combination of lower labor costs, easy regulatory compliance, low R&D expense and low capital investment. China, however, benefited significantly from this movement whereas India only benefited in a smaller way. The statistics show that in 2006, the EU, the US and Japan together held a 57% share which reduced to 33% in 2016.

Over the years, India’s importance in I&SC Sector has been on the rise. A number of factors have placed India in a sweet-spot to participate in a bigger way in meeting the global need for chemical products.

1. Critical Mass and Ability to Invest: The Indian chemical industry ranks 6th globally and has established itself as a major player in the Global Chemical Value Chain. Indian manufacturers have increased R&D efforts, have set up global scale plants and have demonstrated that they can compete globally even against China. Several Indian Companies are eager to Invest to create global sized plants to cater to the growing domestic and global market.

2. Increase in Domestic Demand: India continues to make a mark on the world map as a manufacturing destination and is home to several manufacturers of global scale across diverse sectors. India which has an 18% share of the global population is an emerging economy with a young population that is rapidly urbanizing. About 34.5% of the Indian population stays in urban areas and approximately 68% of the population is of working age (between 15-65 years). However, India’s per capita Chemical Consumption is $103 (5.05% of per capita GDP and 20% of average global per capita chemical consumption) which is significantly lower compared to other developed countries. Due to increased Urbanization and the influence of the Western Countries, domestic chemical consumption is expected to increase significantly in the next 10 years.

SWEET SPOTS FOR INDIA

- Critical Mass and Ability to Invest
- Increase in Domestic Demand
- Preference of Global Players to de-risk their Supply Chain from China
- Equalization of Indian and Chinese Cost
- Strategic and Tactical Raw Material Sourcing from India
3. **Preference of Global Players to de-risk their Supply Chain from China:** The earlier Chinese Model was growth at low cost which was achieved by mushrooming of multiple companies setting up large and medium-scale plants. This was possible due to the easy availability of capital, export incentives and easy regulatory permissions at the cost of environmental pollution and low investment in process safety. Most chemical value chains across the world, especially in intermediates and specialty chemicals sectors, depend heavily on Chinese manufacturing. However, in the past decade, a series of disruptions in supply from China has led to the various chemical companies seeking alternate Raw Material Sourcing options throughout the supply chain. The list of disruptions have had a significant impact on raw material availability

   a. Tightening of Environment Regulations and Investment in ETP’s
   b. The US-China Trade War
   c. Increasing Safety Incidents
   d. COVID - 19
   e. Rising Labor Costs

The increasing uncertainty and unpredictability in sourcing from China have all contributed to reducing the economic incentive of 100% relying on China as the world’s chemical factory.

4. **Equalization of Indian and Chinese Cost:** Before 2012, the Chinese industry governed the product pricing and the costs were very cheap. However, due to numerous factors cited above, Chinese product costs have increased. If we break up the cost structure between India and China, there might be variation in different segments. To provide a qualitative comparison against the Chinese cost, Indian cost component is high wrt. to interest and logistics cost, on par in terms of environment-related cost and low wrt. labour costs and capital investment cost. Overall, the Indian cost is now on par with the Chinese cost. Additionally, the Indian cost is significantly cheap compared to the opex and capital investment costs of developed countries like the USA, Europe, Japan etc. This makes India a strategic destination for long term raw material sourcing and setting up new manufacturing assets.

5. **Strategic and Tactical Raw Material Sourcing from India:** Global giants are looking at other investment destinations such as India, Latin America and Eastern Europe to mitigate the China risk to their supply chains. However, apart from India, none of the other destinations has the dual foundation of a broad-based chemical industry ecosystem and a captive market comparable in size to China. MNC’s have therefore created a strong mandate to increase sourcing from India by entering into mid-long term supply contracts. A number of enquiries are also floated for the development of new molecules which are currently not produced in India or are key intermediates to innovator molecules for global chemical majors. Their strong confidence to source from India in a reliable manner at a competitive price is on account of multiple factors

   a. Improving QHSE standards of Indian companies
   b. Availability of skilled talent pool to develop and operate complex and hazardous chemical processes
   c. Positive Actions by Government

   i. **Ease of Doing Business (EODB) and Make In India**

   - India’s ranking in EODB improved significantly from 142 in 2014 to 63 in 2020, a testimony to India’s rising attractiveness as the worlds’ business destination of choice.

   ii. **Corporate Tax Rates:**

      Competitive Tax Rates at 25.17% and Incentive to new manufacturing units with Tax rates of 17.01% if the production starts before 2023.

   iii. **Other Factors:** Access to ports, robust legal and regulatory framework, depreciated currency against Chinese and US currencies.

**Policy Structure to Turbo Charge Domestic Growth**

The government has taken significant positive steps to boost Make in India initiative. Although India has exhibited the potential for growth, the fact of the matter is I&SC sector has a net trade deficit of $16.3 billion. The growing trade deficit can be countered with a fourpronged comprehensive strategy and policy structure to boost exports and reduce imports while simultaneously reinvigorating the domestic demand and appetite for consumption

1. **Rationalize Duty Drawback Structure**

   The Export industry has two avenues to utilize Export Incentive Scheme - procure raw material (RM) in Advance License or export finished product (FP) in the Duty Drawback scheme. Duty Drawback rates were set so as to incentivize exporters to purchase locally available material v/s importing it via Advance License. However, multiple times, the Exporters prefer importing RM under Advance License even though RM is available in India because duty drawback on the FP is less than the import duty component in RM Cost. This has created the situation of Deemed Duty Inversion and the
Indian Industry is losing on volumes. For Eg: Ortho Anisidine, P Nitroaniline, 3,3-DCBH has excess capacity in India and these products are also exported. However, the Dyestuff and Pigment Exporters prefer to import them under Advance License due to mismatch in Duty Drawback rates with downstream FP leading to loss of domestic sales. In order to encourage Exporters to buy locally and compensate for them for locally procured RM, the standard rate for duty drawback needs to be corrected to avoid Deemed Duty Inversion. A Typical Example and Proposed Duty Drawback is as follows: The government should comprehensively review the assessment basis of duty drawback and rationalize in such cases. This will have a significant impact by reducing imports, reduction in the trade deficit and giving a boost to domestic industry thereby improving scale, employment and tax revenues.

2. Streamlining Environmental Clearances

The nature of these specialty plants is to make multipurpose products. Due to the ongoing nature of technical improvements, these plants have the flexibility to increase capacity in the same setup or add new products of different capacity. Obtaining the product mix approval itself takes 4-6 months thereby reducing competitiveness and leading to missed market opportunities. For Eg: The opportunity to capitalize during the supply vacuum created from China due to the tightening of Environmental Norms is missed as the Industry does not have the requisite regulatory permissions to ramp-up capacity and obtaining these permissions is a timeconsuming process. The current rule/ EC notifications do not permit any construction until an Environmental Clearance (EC) is obtained. This is creating delays in starting up Projects. However, MoEFCC is mulling to introduce a Tatkal scheme whereby EC can be granted on a fast track basis for deserving cases or a single window so that export orders are not affected; such policy decisions are a welcome move. In addition to these, the government can take the following policy decisions to rationalize and simplify the approval process:

- Faster EC: Stage-wise clearance in which a firm may be allowed to begin construction after filing the application. This will save significant time in setting up the Project reducing the time to enter the Market significantly improving Project Viability. This can be initiated in cases where Public Hearing is not required.
- Simplified Statutory Approvals for Expansion:
- Moving to a product-agnostic effluent/ emission-based permission
- Zero Liquid Discharge (ZLD) does not generate any liquid effluent and thereby does not contribute to pollution. This enables recycling of water which is a critical natural resource. Freedom can be provided for capacity expansion for ZLD units as long as they meet air emissions & solid waste norms.
- Marine Discharge should become a standard norm:
- Marine Discharge is a cheap and effective global practice to manage the effluent without impacting the environment. The current Marine Discharge norms are not as per global standards. The standards need to be reviewed accordingly.
- India has signed the Paris Agreement 2016 pledging of Carbon Dioxide. Marine Discharge should become a norm over ZLD as the latter has significantly higher Carbon Footprint.
- Increase Marine Discharge points through pipelines in states where Chemical Clusters are present
- Allow Marine discharge by GPS monitored Road Tankers to marine discharge points for effluent qualifying marine norms.

3. Increase Import Duty for Entire Value Chain

The I&SC sector imports $44.5 billion worth of Raw Materials and contributes to Net Trade Deficit of $16.3 billion. This is largely due to non-availability of key feedstocks as the Integrated Petrochemical complexes are unable to allocate and provide feedstock to the downstream industries. Though the Import Value is high, the current domestic demand is unable to justify Global Scale Plants. This is due to the low duty drawback making it advantageous for the Exporters to Import the Raw Materials rather than procure it locally. To achieve global scale plants, the downstream industry would need to have Raw Materials available locally for a secure, reliable supply chain. This is impacting the investment across the Value Chain from Basic Chemicals to I&SC. To accelerate the Investment Cycle across the Value Chain, bold policy decisions need to be taken which are mentioned as follows:

- Increase Duty on all chemicals by a minimum of 10% across the Value Chain for a 10 year period. To avoid creating an adverse impact to Industry, two options are available:

  - Allow Marine discharge by GPS monitored Road Tankers to marine discharge points for effluent qualifying marine norms.

Table 1: A Typical Example and Proposed Duty Drawback

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Price (INR/kg)</th>
<th>Duty</th>
<th>%</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Imported Raw Material Cost</td>
<td>0.6</td>
<td>Import Duty</td>
<td>8.25%</td>
<td>4.95%</td>
</tr>
<tr>
<td>Finished Product Price</td>
<td>1</td>
<td>Duty Drawback</td>
<td>1.50%</td>
<td>-1.5%</td>
</tr>
<tr>
<td>Disadvantage through Duty Drawback</td>
<td></td>
<td></td>
<td></td>
<td>3.45%</td>
</tr>
<tr>
<td>Required Duty Drawback to Compensate for RM Import Duty</td>
<td></td>
<td></td>
<td></td>
<td>4.95%</td>
</tr>
</tbody>
</table>

Table 2: Impact of increase in Duty

<table>
<thead>
<tr>
<th>Trade Type</th>
<th>Value (B$)</th>
<th>% Duty Increase</th>
<th>Duty Impact (B$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imports</td>
<td>56</td>
<td>10.00%</td>
<td>5.6</td>
</tr>
<tr>
<td>Exports</td>
<td>34</td>
<td>-6.00%</td>
<td>-2.04</td>
</tr>
<tr>
<td>Net Inflow to Govt</td>
<td>3.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
the export industry and assuming that the raw materials comprise an average of 60% in the product cost, the additional increase in duty should be offset through additional duty drawback of 6%. This will still be within WTO Norms.

- Provide FTA protection to the Chemical Sector for a 10 year period. This will provide stability in creating the Business Case and remove any challenges of duty inversions.

These policy decisions will provide better economic viability for Basic Chemicals to Invest to cater to the downstream demand which suffers from a scale disadvantage. This will also lead to additional duty revenue of $3.6 billion to the government.

The increased Duty will have a negligible impact on Inflation as the Cost of these chemicals in the end-use industry is only 3-5% of Total Cost. A simple calculation suggests that the maximum impact on Inflation will be only 0.2%

### Table 3 - Impact of inflation

<table>
<thead>
<tr>
<th>Inflation Impact</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Consumption % of GDP</td>
<td>5.05%</td>
</tr>
<tr>
<td>Import as % Consumption</td>
<td>38.10%</td>
</tr>
<tr>
<td>% Increase in RM Price</td>
<td>10%</td>
</tr>
<tr>
<td>Inflation Impact</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Revised Duty Structure for 10 years will provide good visibility for a long term period which will create a win-win situation to accelerate investment cycle across the entire chemical value chain.

### 4. Research and Development Support with Tax Credits

Research is only 1-2% compared to a global average of 5-7%. The Research Institutes work in isolation rather than collaboration with the Industry as adequate incentives are not available to encourage collaboration. On account of this poor collaboration and inadequate R&D, many “high value-added” products are not made in India.

The government can take the following steps to encourage collaboration:

- Creation of Chemical Innovation Fund (CIF): Government should create a Chemical Innovation Fund where the chemical industry can additionally contribute 33% of CSR corpus to this fund.
- CIF should be used in the following areas:
  - The government through Make in India initiative should offer a minimum of 5% incentive on the Finished Product for the introduction of new products in India for the first 5 years on R&D Effort and initial product stabilization.
  - Open Research: The results of R&D through Chemical Innovation Fund can be made open to all domestic industry players (a similar system is prevalent in China which was one of the key reason for Chinese becoming competitive in Global Markets).

This will enable smaller firms to benefit from the technical expertise available in larger organizations without having to reinvent the wheel. Over time and through collaboration with technical institutions and research labs, it can create a knowledge ecosystem that will raise the competitiveness of the Indian industry as a whole.

### Conclusion

The year 2020 presents challenges as uncertainty grips the world with the outbreak of COVID-19 pandemic. In the COVID-19 scenario, India which stands at the cusp of a new growth curve has projected a more resilient and diversified economy to fight the crisis. In the conquest of a $5 trillion economy, the chemical sector can play a crucial role in occupying significant share in GDP. A holistic outlook with an integrated value chain view coupled with old policy reforms and execution focus can catalyze a virtuous cycle of growth. This can help realize India’s potential to become (a) the manufacturing hub for global chemicals by choice, (b) transition from trade deficit to trade surplus and (c) create significant job opportunities.

By 2030, with the right mix of policy initiatives, the chemical sector has the potential to create a Net Trade Surplus of $80 billion. If we fail to take proactive measures and capitalize on current opportunities, we may end up with a net trade deficit of $70 billion which will be detrimental to the economy. The below graph illustrates the possibilities for Year 2030.

With proper attention, support from the government and right mix of policy initiatives which is the need of the hour, the Indian Chemical Industry has the potential to become the next IT or Pharma sector contributing significantly to the Exports and the possibility to rank amongst top 3 countries in the world in terms of chemical production by 2030.

(Reproduced with permission from Chemical Engineering World, June 2020)
Introduction
The Covid-19 global pandemic was placed the entire society in a situation which we have never experience and faced in the past 10 decades. The pandemic Covid-19 has disrupted businesses and human lives worldwide. Consequently, all the sectors have been affected irrespective of the nature of business, size of the company and contribution in economy. Covid-19 has transformed daily life so substantially that the effects are already visible from space, showing us that change is possible, and results are visible.

The coronavirus pandemic has totally changed demand patterns for products and services across sectors. At the same time, it has been striking how fast several companies have adapted, creating drastic new levels of visibility, alertness, throughput, and end-customer connectivity.

Like many other sectors, the water industry has been affected by Covid-19. Water utilities and associated services, policies and governance have experienced significant impact from the financial slowdown resulting from the Covid-19. Water is a basic need, and in a Covid-19 condition, it adopts a crucial part in ensuring hygiene protocols in wash, sanitization and clean drinking water. This will generate an additional demand for water. While human health and life are our primary and immediate concerns to address, water and environmental systems have seen noticeable impacts due to the reduction of pollutant loading from industries, discharge, transportation and other sources.

Challenges during Covid-19 Around 47% of the world population is going to experience water shortage by 2030. Covid-19 is teaching us that our eagerness for creation should not result in destruction of our planet. The impact to water industry has seen is the temporary relocation of certain workforce, capital and operating expenditures, decline in manufacturing of equipment, technologies and chemicals, delay in water service, delay in activity of new projects, fund raising, and many more.

As Grasim Industries Limited Chemical Division- part of Aditya Birla Group, is the largest manufacture of water treatment & disinfection chemicals in India, and it comes under essential services to society to clean the water. We have faced number of challenges during the lockdown as follows:

- Raw material supply disruptions
- Changes in industrial sector demand
- Supply chain issue
- Labour unavailability
- Government policies
- Hygiene Protocol

Water is one of the essential utilities, hence we must manage to serve the mankind. During Covid-19, safe and reliable water service is essential for drinking and food preparation, hand washing and carrying away waste.

“Water, Hygiene and wastewater treatment will be Green Economy after Post Covid-19”

Opportunity after Covid-19
The pandemic has bolstered the critical need for access to safe and assured water supply to all. There are areas where impact can be noticed of Covid-19 on water industry. During this time the market situation is changing rapidly, mind-set of people and customers buying patterns also. It’s for sure that people will be more focused towards hygiene and quality of water which they are using. Supply of clean water and safely treating the wastewater is difficult task. Covid-19 results in increase in water demand parallel to the water and wastewater treatment chemical like disinfectant, coagulant etc. and complete technologies solution.

As per government, it has been noticed that significant improvement in water quality of rivers like Yamuna, Ganga due to reduced industrial effluent. The improvement in this period hints that there is a chance for the Yamuna/Ganga to get cleaned up easily if the people, industries and the government come together.

These both scenarios indicating good opportunity in water sector in near
future. Hygiene practices, clean water supply and treatment of wastewater generated will be the key focus areas.

Sanitation and Hygiene Services

As per guideline of WHO/UNICEF, sanitization and hygiene services are the essential part of preventing and protecting human health during the outbreak of Covid-19. Grasim Industries has played very essential role in surface sanitization and hygiene services by providing the disinfectant.

Grasim help the society & government to get disinfected the public spaces, sanitize the contaminated zone with the help of disinfectant like hypochlorite. Sodium hypochlorite and stable bleaching powder has majorly supplied to the hospitals, public spaces, contaminant zone to disinfect the places regularly during lockdown and avoid the spread in community during lockdown challenges. Along with as a part of CSR activity, Grasim has donated sodium hypochlorite and stable bleaching powder for disinfection and sanitation purpose which benefitted over 3 lack community members. At Grasim Chemical Manufacturing places like Nagda, Vilayat, Ganjam, Veraval, Karwar, Renukoot, Rishra and Halol, our units took over the cleaning of public spaces, hospital, railway station and many more. In focus villages, Grasim Chemical Division, Nagda has undertaken sprinkler surface sanitization, benefiting villagers.

Safe Drinking water Supply

Conventionally, central water treatment methods that utilize chemical, filtration and disinfection should inactivate the Covid-19 virus and protecting the water which confirming that water safely reached to the users.

As a water treatment coagulant and disinfectant manufacturer, we faced lot of challenges during lockdown like raw material unavailability, transportation and manufacturing of chemicals, supply to the water treatment plant. By coordination with government departments, Grasim Chemical division has fulfilled the requirement to get the safe potable water access to public by providing purifying chemicals like Polyaluminium chloride, sodium hypochlorite, stable bleaching powder and chlorine gas. The purifying chemicals are among the essential commodities and therefore it may be ensured that these are part of the running supply chain. Grasim Chemical has done wonderful work to provide safe drinking water to Mumbai, Delhi, Jaipur, Varanasi, Lucknow and rural cities without interruption in supply.

Due to border seal, we faced interruption in supply of chemicals, but it can be immediately brought to the notice by Grasim Chemical and timely taken action to supply from different manufacturing location to reinstate the supply.

Safely Manage the Wastewater

There is no evidence till date that the Covid-19 virus has been transmitted via sewerage systems with or without wastewater treatment. However, few articles strongly mentioned, it must have probability to spread through the sewage. Hence, wastewater should be treated in well-designed and well-managed centralized wastewater treatment works.

Providing clean water discharge and safely treating wastewater – is a critical & it help to reduce the potential risk associated with wastewater. Grasim has supplied their speciality range of product like VITAL solution to remove the pollutant in sewage water and disinfect with the help of calcium hypochlorite. This treatment help wastewater works to treated generated sewage and discharge into the river without harming potential.

Conclusion

Overall, impacts of the Covid-19 pandemic on the water sector can be better evaluated once conditions get in control. There will be many lessons learned from current pandemic and impacted the water industry in many terms. Situations are still more volatile and difficult to predict how industry will evolve. The recovery process will take time and mostly varies by consideration of associated sub-categories like project management, water utilities services, chemical availability, sanitization, hygiene and disinfectant demands, technologies etc. It must be delay in new project due to CAPEX allocation, delayed in construction timeline but essential services will not be impacted more.

Water quality improvement due to lockdown, followed hygiene practices, and requirement of safe drinking water clearly indicating the demand of water and wastewater treatment will be in focus upcoming year after post Covid-19. It ultimately boosts the market of water sector. There might be a good opportunity are coming in near future, reasons we have already discussed and ultimately boost the water sector market.

During lockdown, Grasim has provided technical assistance to governments to strengthen system by support to water and sanitation utilities, availability of water and wastewater treatment chemicals and help nearby societies by sanitization as a CSR activity to protect from Covid-19. Also Ensuring the viability of critical supply chains such as for water treatment chemical availability in markets.

We are trying to keep production unaffected as we directly supply and service critical industries making chemicals in addition to several water and wastewater facilities where continuity of operations is critical to overcome the crisis.

"The story was originally published in the July 2020 issue of Everything About Water magazine" (http://eawater.com/eMagazine/july_2020.html)

(Reproduced with permission from Every Thing About Water, June 2020)
Judging by headlines in the lay and technical media, all roads for alternatives to the internal combustion engine as a driver of mobility, seem to be headed in the direction of electric vehicles (EVs) powered by lithium ion batteries (LIBs). Much of this due the efforts of companies such as Tesla and several lesser known ones in China.

But a closer examination of the strategies automotive companies and their partners are adopting to grow ‘greener’ point to another initiative that seems to be gathering momentum. This involves the use of hydrogen, in fuel cells, to generate power, with water as the only tailpipe emission. Sceptics will roll their eyes when they hear fuel cells; hydrogen has been down this road before, only to flatter to deceive – first in the 1970s, when the OPEC oil-shock hit, and later in the 1990s, when climate change emerged as a concern.

But this time around, hydrogen’s fate may be different – technologies are maturing, and there is renewed interests by businesses working in consortia to develop scalable and integrated projects. The interest has diversified beyond cars, to powering trucks, ships and aircraft, and to rework industrial processes. Hydrogen, for example, is being touted as a ‘green’ and efficient way to transform iron ore to steel, as a means of storage of intermittent power sources as wind and solar, and as a source of heat (instead of natural gas).

Several challenges
The lofty promise is of hydrogen-fuelled economies, akin to the fossil-derived ones of today, but several of the challenges that inhibited development in the past are valid even today. The first is that hydrogen – or for that matter any alternate energy source – challenges the status quo. Ripping apart the mammoth fossil-fuel infrastructure (think refineries, pipelines, fuel dispensing stations etc.), and building new ones, is a very big ask. The second is that, though better than batteries, hydrogen has a poor energy density on a volumetric basis compared to fossil fuels, which means one needs to carry more of it to do the job!

Thirdly, hydrogen is not available in nature (as fossil fuels are), and needs to be manufactured from something else. So far, the raw material has been fossil fuels. This is done by a process called steam reforming, and is widely practiced, for example in oil refineries (that require massive quantities of hydrogen to upgrade crude oil fractions and make them perform better and cleaner), and in fertiliser plants that make ammonia (mainly for urea). The hydrogen so-produced is now disparagingly termed as ‘grey’ hydrogen to denote its carbon-intensive nature.

If this is to be the only way of getting to hydrogen, it beats the whole purpose of using it as a low-carbon strategy, but there is one other route. The electrolysis of water is the ‘holy grail’ of hydrogen production, with the electricity needed coming from non-carbon sources such as solar, wind, hydroelectric or even nuclear.

In recent months two significant initiatives have been announced that represent two different approaches to ‘greening’ hydrogen production.

‘Green’ hydrogen by electrolysis
The first project to be implemented by a consortium comprising the industrial gas major, Air Products, Saudi Arabia’s ACWA Power, and the Kingdom’s development agency, Neom, plans to build the largest ‘green’ hydrogen production facility in the world, with a capacity of 650-tpd (tonnes per day). The electricity needed to split water will come from solar and wind farms in the vicinity, with a cumulative capacity of 4-GW. The project will cost $5-bn – to be funded equally by the three partners – and is targeting 2023 for completion. The infrastructure to distribute hydrogen will cost another $2-bn, and will be owned and funded by Air Products.

The project plans to circumvent the inadequate local demand for hydrogen, by converting it to ammonia (by reacting it with nitrogen separated from air), and shipping it (for which infrastructure is readily available) overseas. The project, as currently defined, calls for an ammonia plant with a capacity of 1.2-mtpa – with each tonne containing about 177-kg of hydrogen. Once at its final destination, the ammonia is to be split to its constituents – hydrogen and nitrogen.

Given the obvious complexity of the scheme and the high capital costs, it has, not surprisingly, attracted scepticism. While Air Products has not disclosed the efficiency of the whole process, the laws of thermodynamics will certainly take an ‘energy’ toll – the amount of energy available in each conversion (water-to-hydrogen-to-ammonia-to-hydrogen) less than that which went in. This then raises a pertinent question: why not use electricity directly, instead of going through these contortions?

Air Products has focussed on the carbon savings achievable, claiming that it will amount to 3-mtpa of CO2, compared to hydrogen produced by steam reforming – equivalent to the annual emissions of 0.7-mn cars.
‘Blue’ version
The other hydrogen project is just as ambitious, though different. It involves the production of ‘blue’ hydrogen – produced by the conventional process of steam reforming, but with a carbon sequestration and storage unit built downstream to minimise the carbon footprint. The Norwegian oil & gas company, Equinor, will be the lead investor in the project, which is to come up in a Chemicals Park in Hull, England, by 2026. The hydrogen is to be used by chemical companies onsite, and also blended (at 30% concentration) into the natural gas that feeds a local power station. Equinor claims the project will save 0.9-mtpa of CO2 annually, compared to a ‘grey’ hydrogen plant.

Japan too is eyeing a similar project, but one spanning multiple continents. It involves producing hydrogen from lignite deposits in Australia, burying the co-produced CO2 locally, and ferrying the ‘blue’ hydrogen across the Pacific in tankers akin to those that now carry liquified natural gas (LNG).

Batteries or fuel cells
Though transportation will be one of the early markets for hydrogen, in all its forms, it may not be for private cars – a segment wherein EVs powered by LIBs have taken a considerable lead. According to the International Energy Agency (IEA), while there were 5.1-mm battery powered cars on the roads in 2018, just 11,200 hydrogen-powered cars plied, mainly in America and Japan. According to an analysis carried by the Committee on Climate Change, UK, while a battery-powered car charged with electricity from a wind turbine converts 86% of the turbines output to forward motion on the road, the comparative figure for a fuel cell car is just 40-45%.

But hydrogen could have a brighter future for lorries, which typically ply on fixed routes (mainly highways), and hence can be serviced by fewer refuelling stations. Hydrogen’s higher energy density, as compared to batteries, even when stored in gaseous form (and even higher when liquefied) will be a factor in its favour. While this is common understanding, companies like Tesla are challenging even this notion. The company plans to launch a battery-powered lorry that can travel 800-km, and Hyundai already has one that can do half that distance before needing recharge.

Industrial & other uses
Another possible industrial application for ‘green’ hydrogen is the reduction of iron ore to the metal – currently achieved by reacting the ore with carbon monoxide (made from coke) in a blast furnace. Several steel companies, including ThyssenKrupp Steel & ArcelorMittal, are examining this. Hydrogen could also have a role in heating. It can be ferried in the same pipelines as natural gas, and most gas-fired boilers can take in up to 20% hydrogen without any modification.

Economics and support
The European Commission, which has set a target for hydrogen to meet 14% of Europe’s energy needs by 2050, has expressed willingness to co-fund ‘blue’ hydrogen projects, wherein at least 90% of the CO2 is captured and stored. This, it believes, is vital to garner industrial support for the transition to a ‘greener’ version. But the plan has its critics who believe ‘blue’ hydrogen is at best a half-measure, and incentives are better directed at the ‘green’ variety instead.

Preliminary analysis of the costs of hydrogen produced range from $1.6-1.90 per kg for ‘grey’, to $2.20 for ‘blue’, and $2.80-6.15 per kg for the ‘green’. But it is reasonable to expect costs of ‘blue’ and ‘green’ hydrogen to decline as technologies improve and scale increases. Some forecasts suggest costs could come down as sharply as they have done for solar and wind energy, and ‘green’ hydrogen could be available by 2050 at the current price of the ‘grey’ one. Much, however, will depend on the extent of government support and subsidies.

To paraphrase the Economist, ‘green’ hydrogen is “electricity in disguise” and “remains an inescapably inefficient option.” But despite that, its advantages – its energy density, its ability to burn cleanly and its compatibility with existing infrastructure – could make it an attractive fit in some applications.

Talk of a hydrogen economy is premature, but it will likely have a larger role as a secondary energy source.
Abstract:

The coronavirus disease (COVID-19) pandemic has reinforced the vital importance of resilient water and wastewater infrastructure and services as well as hygiene and behavioural change to protect human health.

In Asia and the Pacific, the development and management of such infrastructure and services faced significant challenges, considering also the need to tackle climate change, recurring disasters, and other crisis events. The COVID-19 crisis may exacerbate the situation even further.

To bring about change, ADB promotes an innovative approach to design, procure, and implement resilient water and wastewater infrastructure and hygiene behavioural change to ensure availability and sustainable management of water and sanitation for all. ADB’s innovative approach applies strategic procurement planning, focusing on operations and maintenance of infrastructure and innovative technologies to deliver reliable services to increasing populations. The strategic procurement planning at the project processing stage assesses procurement risks and supply market capacity. It considers the future performance of water systems, especially how and by whom the infrastructure will be operated and maintained, and its use of climate-friendly and low carbon technologies. This will contribute to developing a resilient infrastructure at an optimal price and cost, and attracting further a much-needed financing and trust in the water sector.

The coronavirus disease (COVID-19) pandemic has ingrained in people’s minds that resilient water and wastewater infrastructure and services as well as hygiene and behavioural change are critical to protecting human health not only in normal times, but even more so during infectious disease outbreaks.

The people operating water and wastewater utilities have been praised for their efforts during this difficult period. Global Water Intelligence dedicated 25 June to water workers, launching a hashtag to thank them for their engagement during this crisis.

All important factors, such as water service providers and utilities workers, development partners, private sector, non-government organizations, and communities mobilized expeditiously and efficiently to ensure continuity of water and wastewater services, and to implement Water Sanitation and Hygiene (WASH) programs to promote population health, welfare and development.

Considering the need of tackling climate change, and recurring disasters and other crisis events, water workers’ activities are becoming more complex, specialized, and modernized. Besides the vital role and continuity of engagement of water workers, technological innovations such as digitization and remote monitoring of assets were seen as critical during the recent pandemic. A study developed by Piers Clark, CEO of Isle Utilities, has highlighted as one of its important conclusions that water utilities need to engage more with remote technology using automation and decision intelligence. In line with this, a 2020 study from Black and Veatch shows that only 20% of utilities surveyed are using digital solutions to effectively implement their activities.

In a recent presentation to the Asian Development Bank (ADB), Taqsem Khan, CEO of Dhaka WASA highlighted the importance of digital systems and supervisory control and data acquisition (SCADA) to inspire teams and manage water service continuity and other resources such as smart metering systems, and online bill payment.

Many utilities, which developed business continuity plans to cope with the new normal, are still in crisis mode and in the process of reverting to their usual business costs: the 2020 Black and Veatch study shows that the crisis impact on the water utility business is expected to be at about $17 billion for clean water utilities and $14 billion for drinking water utilities, due to challenges in billing, collection, and operating health risks. While the world is already on the curve to miss Sustainable Development Goal (SDG) 6 targets (to ensure availability and sustainable management of water and sanitation for all), the COVID-19 crisis may exacerbate the diversion further.

On an optimistic note, one of the clear priorities of post-COVID-19 “new normal” will be increased support to utilities to provide everybody with access to water and wastewater services as per SDG-6. Governments may decide to engage even further in promoting and developing resilient water and wastewater infrastructure and associated WASH programs, which require minimal access to water to engage visible and sustainable communities’ behavioural change.

Still, the reliability and sustainability of water and wastewater infrastructure remain a challenge. Resilient infrastructure is designed and developed to address present and future needs and shocks at an optimized cost that includes relevant technology and is adapted to climate change, is operated efficiently with adapted capacities and brings reliable services to people. The question now is how. How can these be developed?
How can international institutions such as ADB innovate to design, procure, and implement resilient water and wastewater infrastructure and hygiene behavioural change to put SDG-6 back on track? What should not be missed in the coming crucial years?

To bring about change, ADB is promoting an innovative approach as described below using strategic procurement planning, focusing on operations and maintenance of infrastructure, and introducing technology and innovations to deliver reliable services to increasing populations.

A Challenging Context

The World Health Organization estimated that in 2015, 2.1 billion people worldwide lacked safely managed drinking water, with climate change amplifying every year the frequency and severity of climate impacts on water resources. The latest United Nations report on progress towards the SDGs states: “More efficient use and management of water are critical to addressing the growing demand for water, threats to water security, and the increasing frequency and severity of droughts and floods resulting from climate change.” According to a UNESCAP report, around 260 million people in Asia and the Pacific still don’t have access to a protected source of water. Resources are more constrained. Despite years of efforts from the public sector, private sector, and development partners, lack of efficient and sustainable systems to manage water and wastewater services is a big concern. The governance and organization of the relevant institutions in the water and wastewater sector are still grappling with outdated technical, managerial, and tariff models.

The development and management of water resources, infrastructure, and services in the Asian region have mostly been insufficient, especially in cities which, in most cases, are significantly lagging behind the urbanization.

Recently, severe water shortage hit a number of cities, including Cape Town, Chennai, and Manila in 2019, as water resources are depleting while urban water demand is continuously increasing. In many cities in Asia, ever-increasing quantities of water need to be sourced and treated to satisfy growing demand. In many cases, a significant amount of water is lost in non-revenue water (NRW), either through physical leaks due to dilapidated and worn-out pipes or through commercial losses due to lack of customer registration, metering and billing systems. Inefficient water networks often have low or variable pressure that severely impacts the quality of water delivered to customers as wastewater can infiltrate the water network.

Furthermore, such water losses severely impact the energy efficiency of water systems. A 2018 study developed in Georgia by the Cities Development Initiative for Asia (CDIA) demonstrated the strong linkages between the high power costs for a water utility and high NRW. Better leakage control, as well as recommended measures towards proper management, billing, and operations, could result in significant electricity savings. This is so promising that in 2018, ADB has developed the Screening Tool for Energy Evaluation in Projects (STEEP) for water and wastewater systems. This tool has been piloted on several projects, which have identified potential energy savings to over 50%, compared with the energy use of the implemented design.

As for wastewater, the infrastructure situation is even more worrying. While in 2017, 1.2 billion people across Asia and the Pacific lacked access to basic sanitation services, a recent study conducted by Wateraid to understand the sustainability of large wastewater treatment plants after project completion has shown that the resilience of wastewater treatment plants is low: with an average of about $1 billion of yearly official development assistance, more than half of the plants constructed were never commissioned or taken off-line or continually overloaded/underloaded. Commonly, projects were not well adapted to operations and maintenance, and the infrastructure was not properly built, sized, or operated, due to lack of operating staff capacity.

Such lack of effectiveness or poor sustainability makes it more challenging to attract future investments either from the public or private parties, and also raises questions about the way the projects were designed, procured, or operated. The sustainability criteria are closely linked with the procurement modality that defines how the infrastructure projects will be developed, designed, implemented, and managed.

The strategic procurement planning revolution

ADB has developed its long-term Strategy 2030 for achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific, which stresses that efforts to eradicate poverty should focus on delivering services to the population. The infrastructure is not a target by itself but rather it’s capacity to deliver the quality of services to the population in a resilient way.

To support this, ADB in 2017 adopted a new procurement framework that shifts from one-size-fits-all to a fit-for-purpose approach with a greater focus on quality and value for money. The new procurement framework also introduced the Strategic Procurement Planning at project processing stage to assess procurement risks and supply market capacity, develop best options for procurement of goods, works and services, and inform the project design. Such Strategic Procurement Planning is more effective as it facilitates (i) ADB and project owners to better understand and analyze the diversity of technologies available in the market so as to bring innovative and state-of-art approaches, (ii) determine potential players in the market, (iii) propose...
outreach strategies to disseminate information about projects and make procurement packages attractive for potential players, and (iv) assess the main risks in the bidding process, and propose mitigating measures. This ultimately ensures the selection of quality suppliers and thus better value for money for the projects.

This strategic procurement planning is a big change. It ensures that the overwhelming efforts to initiate, negotiate, conceive, and build infrastructure should focus on the concept design as well as on a realistic assessment that the project design is strategically prepared to procure what the market can provide at an optimal quality and cost, and with a modality adapted to the capacity of the institution developing it.

This fit-for-purpose approach in project design and procurement arrangements is expected to result in improved quality and greater value-for-money, reduced time to deliver procurement outcomes, and higher quality suppliers bidding for projects, with strengthened procurement capacity of developing member countries. The operating environment study should include the borrower’s capacity and capability assessment, as it is a key component of how the operation and maintenance services should be considered during project design and supported during implementation. Then the market analysis provides feedback on the actors potentially interested and eligible to do the works. The country and sector procurement risk assessment analyses the severity of risks and identifies strategic options. The procurement strategy is then selected, including bidding procedures, contracting strategy, and contract management.

In line with the development of resilient infrastructure, the strategic procurement planning answers two key questions: (a) how to ensure at the start of a project that operation and maintenance of the infrastructure facility will continue to deliver its benefits over many years and that its assets last their lifetime; and (b) how to ensure that new technology and innovation, including climate-resilient and green technology, can offer better financial and environmental benefits?

**Introducing Operation and Maintenance in Infrastructures Projects**

The strategic procurement planning should consider the future performance of water systems, especially how and by whom the infrastructure will be operated and maintained. Most advanced utilities have a comprehensive approach to locate, identify, qualify, and manage infrastructure assets, as well as assess the financial requirements to maintain them at a targeted performance. In Asia, though, this is often not the case.

Many utilities require a systematic way to prepare asset management plans for timely repairs, rehabilitation, or replacement of assets, and to develop an effective strategy for long-term funding of operation and maintenance services. These large infrastructure projects should fully consider operation and maintenance aspects and capacity building from the design stage as this sets the foundation for the sustainability of the infrastructure and the efficiency of the services provided.

Operation and maintenance components can be introduced using different modalities. In standard employer-designed contracts, the design of the infrastructure is done by the employer, the construction by the contractor, and the operations and maintenance by the operating public utility. Procurement modalities request for works only with detailed design included in the bidding document, and operations and maintenance may be introduced for the first few years, as in the West Bengal Water supply project, the Rajasthan Water Supply Project, or Madhya Pradesh Water Supply Project. Generally, while the employer controls the design, this procurement modality may limit innovation and increase project life cycle cost, as there are limited incentives to reduce capital costs or operating costs. For instance, if the cost of the chemicals and energy are not the ones planned, the employer will bear it. There are limited incentives for designers to ease the operations phase or to limit maintenance and asset replacement that will usually appear a few years after the operation starts. Also, in the case of non-performance of the infrastructure, the parties may blame each others without easy solutions, and it may increase costs and time. If the public utility does not have the capacity to operate the infrastructure, this procurement mechanism is including a limited knowledge transfer to develop its operating staff, for instance, to operate a water or wastewater treatment plants using more complex technology.

In design and build contracts, the design and the construction phases are handled by the same contractor, and the operations and maintenance is done by the operating public utility. The selection process is simplified and the responsibility is concentrated on the same company undertaking the design and construction responsibilities.

The design-build construction company will have incentives to use innovative design, to achieve lower construction costs and faster delivery as they handle both. On the other hand, the employer may lose some control over the design process, and the cost incentives may negatively impact infrastructure quality. This form of contract may reduce competition as there are less number of eligible companies combining capacity to lead both phases. Also, there is still potential for conflicts with the operating utility. The capacity-building mechanism of the utility is limited and the operating phase may start late, or improperly as unskilled staff will impact the efficiency and durability of a water or wastewater treatment plant.
Recently, pure design-build-operate (DBO) contracts have been used for implementing infrastructure projects while improving resilience: employer defines outputs specifications related to what the infrastructure is supposed to deliver to people, as stable and high-level quality of water and wastewater.

DBO contracts request for design and works to be associated with defined operation and maintenance targets in their contracts, including energy, water efficiency, or wastewater quality targets to which payments to contractors are linked. If the targets are not met, contractors will have less revenue during the operating phase, which is a good incentive for them to deliver a high-quality infrastructure during the design phase. The contractor may submit innovative technology, as a bidder is selected based on the lowest life cycle cost, including the operating costs as energy, chemicals, and capital costs as assets replacement. The contractor is directly interested in infrastructure resilience as it needs to last for ten years or more. For instance, DBO modality was used in the Sri Lanka Desalination project and the Dhaka Wasa Water treatment plant and is now being adopted in Kiribas to develop a new desalination plant.

DBO requires a strong control from operating utility on the contractor to perform as planned, and has a more complex contract management phase as it is on a longer period with different and variable parameters. The employer needs also to secure the necessary funding to cover contractor operating fees on the period. The operating utility should be involved and interested in the performance of the infrastructure. Experienced operators should be in charge of the preparation of bidding documents to prepare realistic and achievable targets, on which contractor can act. Other forms of contracts to introduce operations and maintenance phases may be developed in the near future, especially to promote further innovations from the private sector to better manage assets and investments.

**Introducing Technology and Innovations in Infrastructures Projects**

Innovation hubs are now at the centre of attention of development institutions to attract the best ideas available on the market to be used in development projects. These innovations include climate-resilient and low carbon technologies to be used in building infrastructure facilities.

Climate-resilient and low carbon technologies may be using big data and smart systems to better manage water resources with higher accuracy and reliability. They range from traditional SCADA to more sophisticated smart systems using big data collected from many sensors and machine learning algorithms to efficiently manage networks and plants. Smart systems help improve asset performance by integrating geographic information and mapping systems with asset and customer management systems, including smart water meters to provide valuable data about the amount of water supplied to and used by customers.

In Dhaka, ADB has supported water network monitoring using SCADA, which allowed better control and improved water efficiency in district metering areas (DMAs) and reduced NRW. In the People’s Republic of China, ADB is financing the Jilin Yanji Low Carbon Climate Resilient Healthy City Project, which will include smart water meters. Consumption patterns of households will be analyzed to detect abnormal patterns of water consumption that may be related to personal emergencies like illness or accidents and will send an alert to the water utility. In line with this, recent results on COVID-19 analysis on wastewater samples have shown an interest in the use of wastewater systems as community health monitoring systems, since the tracing of the virus has been demonstrated to be useful to understand epidemic evolution and as an early warning system.

Climate-resilient and low carbon technologies can also be included in green and climate-resilient infrastructure involving nature-based design, to ensure the sustainability of infrastructure due to its better alignment with future climate events and greater use of greener materials reducing the impact of extreme water events, such as floods and typhoons. The Jilin Yanji Low Carbon Climate Resilient Healthy City Project includes climate-resilient flood risk management and sponge city green infrastructure – in residential areas within the catchment. Water quality will be improved through the construction of sedimentation tanks and sand filters at the end of drainage pipes, and ecological river rehabilitation.

In cities, recent epidemic events have also raised further the interest of making the city environment, the city assets, and the people connected. More sustainable infrastructures will be enhanced with the use of big data coming from sensors (e.g., pressure, flow, pH, chlorine, etc.) and the outputs derived from such data: better network efficiency, better water quality from plant to customers, and more focused investments using artificial intelligence to identify priority areas to rehabilitate in water networks, real-time follow up of energy consumption.

But using and benefiting from these data systems is not possible without a well-prepared procurement phase, and well-designed operation and maintenance requirements.

We must learn from the past and from the water and wastewater infrastructure operators: as schematized in Chart below, a resilient infrastructure should include from the start the requirements
of the people operating it, including the most adapted and climate-friendly technologies, so efficient services can be delivered to end-users. Improving the resilience of water and wastewater infrastructure is also key to attract financing and trust in a sector that has to some extent a poor reputation due to its limited efficiency and financial sustainability.

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India’s approach to development in the last 2-3 decades has been service sector-led and has undermined manufacturing; at the same time, China has made rapid strides in manufacturing. This has resulted in an uneven balance between the two in their development stages.

China has developed capacities across a wide spectrum in applied engineering and chemical processes and has attempted to capture global markets. India on the other hand is stuck with various low-end services, many of which are of “body-shopping”, the scope for which is rapidly declining. It has begun to lose abilities in manufacturing, even in fields where it still has some presence, e.g., pharmaceuticals (68% dependence on China, for active ingredients) and auto-industry (15-20% dependence on China for electicals, electronics and fuel injection), to name two. The list of items on which India depends on Chinese imports include solar panels, metal-ware, cloth-ware, industrial machinery, a range of consumer electronics like mobile phones and TVs, and even low-end products like furniture, kitchenware, toys, kites or incense.

The annual trade-deficit between the two countries, of over $50 billion, is unsustainable for more than one reason. First, most Indian exports are raw materials or in that genre (low-tech and low employment, like ores, rare earths, chemicals), while the imports are in manufacturing (high-tech). Such a trade pattern inevitably results in unequal terms of trade in time (“I can do without your products but you can’t without mine – case, Chinese manufactures vs Australian barley and beef”). Next, as stated earlier, even in areas where India has some competence, critical inputs are imported from China. Third, a sustained current account deficit has led India to multilaterals for loans even for undertaking earthworks, and then use the foreign exchange to balance the current account. Since most multilaterals require global tendering for awarding contracts, Chinese companies creep-in through (at times) questionable routes to dig tunnels or make railroads in India, making Indian industries functionally further unfit. India is thus progressively exporting meaningful jobs to China, draining precious foreign exchange, and losing prowess in modern technologies and manufacturing.

Trade is advantageous to all when the trading countries have equal wares to share and that there is a shared vision of mutual welfare. The present
dynamic, however, suggests that China quotes low prices to obliterate industries in unsuspecting countries, manipulates currency, follows few labour standards to cut costs, undermines IPRs, and inundates other countries with large loans, eventually landing them in a debt trap (Sri Lanka's ceding of Habantota Port, with more to follow through BRI). They practice hostile takeover of companies and countries through any means including gunboat diplomacy—a 18th/19th century approach of European colonisers (China-India or China-Vietnam border threats).

India’s approach to development—following an Indian version of the Washington Consensus since the last three decades—has to change in favour of manufacturing if a total surrender is to be forestalled. There would be short-term financial losses to consumers, traders and domestic manufacturers for up to 2-3 years by not being able to import inexpensive auto- and machine/electrical parts or active ingredients in pharma from China, but this will gradually reduce. Lower imports from China would also imply better overall terms of trade and therefore, stabilisation of the rupee, resulting in lower rupee value of petroleum products. Thus, even if the price of a motorbike, car, or bus goes up, the cost of imported transport fuel correspondingly falls, evening out the said price increase in the former. Next, a near ban on imports of low-end products and consumer goods will create more jobs, and further stabilise trade deficits/rupee.

Business analysis at Bloomberg believes that up to 3,000 imported (Chinese) items (toys, watches, plastic products) could be substituted by local supplies. This is not reversion to the import-substitution model of yesteryears: there is a clear difference between strengthening local companies to become globally competitive (proposed) and companies producing under license for captive markets (earlier). Also, there is more than economics here: Earlier, local industries could not grow in size due to controls, now they can; and earlier, they were psychologically not prepared to face international markets, now they are. Also, the approach proposed here is not to fully substitute imports but to reduce unnecessary imports for saving foreign exchange and jobs, along with weaving the Indian industry into the international division of labour. This would necessarily imply a great deal of imports, but which would also boost exports, local competence and jobs.

The present government, while making the right statements through the ‘Make in India’ campaign, has no manufacturing strategy. The share of manufacturing in GDP and employment has stagnated since economic reforms began in 1991 and manufacturing employment actually fell after 2014.

India needs a strong industrial policy for development, employment and facing a belligerent China. There are at least five components of a proposed policy:

Government and industry need to work closely and create mutual trust for promoting industries through tariffs, subsidies, land and labour law easing, infrastructure, etc. Like the MITI of yesteryears in Japan or South Korea more recently, the government must help national companies to grow and become internationally competitive. That is what China did.

Approaches to gain economies of scale need to be put in place to overcome India’s shortcoming of having 66 million MSMEs. A “one-state/district-one product approach” can bring together SMEs to form a single giant unit. Again, the state needs to initiate this process by means of planning.

Need to invest heavily in targeted R&D, for which private-public sector partnership is essential. Indian government and defence labs along with R&D Departments of private and public sectors require joining hands for this. Expenditure on R&D should rise 3-4 times from 0.7% of GDP at present.

Investment in education, training, and human capital formation should rise from the current 3% to 6% of GDP, with greater industry-based training, focus on quality, and emphasis on STEM.

Contain brain-drain out of India (from top engineering and medical colleges) to foreign shores. Partnerships with the best universities in the West is one approach to provide quality education here.

(Source: Financial Express 11 July, 2020)
It is common knowledge that life in the post-COVID era will not be the same. The effects of the pandemic are expected to have a lasting impact on every sphere of activity, even as various nations are trying to revive their economies and protect livelihoods.

As pandemic-induced lockdowns battered economies, disrupted global supply chains and affected livelihoods across different sectors, Prime Minister Narendra Modi gave a clarion call to make India self-reliant. He announced the Atmanirbhar Bharat Abhiyan to propel the country on the path of self-sustenance.

With the twin objective of reviving different spheres of the economy in the short term and insulating India from any future global economic downturn, in the long run, the Abhiyan seeks to build capacities across sectors and promote local products. At the same time, Atmanirbhar Bharat is not meant to promote protectionism or isolationism by erecting trade barriers. Rather, it seeks to make the Indian economy robust in the long run by scaling up manufacturing, accelerating infrastructure development, attracting investments and promoting a consumption-led growth.

The youth are the future of any country. But India can take the lead over many other nations because about 65 per cent of its population is below 35 years and 50 per cent is below 25 years. With a huge, educated young population, India is uniquely poised to realise its demographic potential. The fact that Indians are heading several MNCs shows that there is no dearth of knowledge and talent in the country. However, the need of the hour is to upgrade the skills or upskill the youth to meet the employment needs of technology-driven 21st century and accelerate the pace of self-reliance.

One of the most profound impacts of the pandemic has been on workplaces. Offices straddling multiple domains, particularly IT, are functioning with minimum staff strength. Most organisations are allowing their employees to work from home. The uncertainty created by the pandemic is being seen by many as an opportunity to upgrade their knowledge and acquire new skills.

The UN has quite appropriately chosen the theme “Skills for a Resilient Youth” for World Youth Skills Day today, which is being observed by holding virtual events.

According to the UN, the pandemic and lockdown measures have led to the worldwide closure of technical and vocational education and training (TVET) institutions, threatening the continuity of skill development. It is estimated that nearly 70 per cent of the world’s learners are affected by school closures across education levels. TVET institutions play an important role in equipping the youth with the skills for
employment, including those needed for self-employment. They also help in upgrading or re-skilling low-skilled youth.

Much before the current pandemic, the fourth industrial revolution triggered a paradigm change with digital technology driving the job market. Remote working with increasing adoption of digital technology might continue to be the modus operandi for the foreseeable future.

A host of skill sets — listening and communication, cross-cultural sensitivity, adaptability to changing work environments, emotional intelligence and social etiquette along with a good academic record — are important for those seeking employment in the emerging job scenario. Artificial intelligence, machine learning, data science, cloud computing and Internet of Things, among others, will be relied upon by companies. With people increasingly resorting to online buying, companies will seek to adopt new online marketing strategies.

The India Skills Report-2020 says that currently, millennials constitute nearly half (47 per cent) of the country’s working population. This is likely to remain the largest chunk of the Indian workforce for the next 10 years.

Another important issue that needs to be addressed by all stakeholders is ensuring equitable employment through higher participation of women in the workforce.

In the backdrop of the call for Atmanirbhar Bharat, there have been some reassuring developments with an accent on “local to glocal”. The production of several lakh PPE kits, collaboration of automobile industries to produce ventilators, manufacture of more than 70 Made in India products by the DRDO, development of the low-cost ventilator Prana-Vayu by IIT Roorkee, the products developed by start-ups in Karnataka to tackle COVID-19 are just a few examples of the capability of Indian scientists, IT professionals and technocrats.

Based on the locally available resources, talent, and skills of the human capital, we must aim to gradually reduce imports in every sector from crude oil to heavy machinery.

While remaining vocal about local, there has to be a paradigm shift in all areas for Indian products to be globally competitive. We must endeavour to stay ahead in the innovation-led knowledge economy. PSUs and the private sector must not only play a complementary role in building a self-reliant India but collaborate wherever feasible. Undoubtedly, the private sector must massively step up investments R&D. PSUs too need to modernise in terms of technology. In areas like hi-tech medical devices and equipment, India has to drastically increase manufacturing to cut down imports and save precious foreign exchange.

This is the time for 130 crore Indians to showcase the country’s collective resolve to overcome the setbacks caused by the pandemic. We need to forge ahead by harnessing India’s human resources and technological capabilities. To remain globally competitive with a well-assured future, we need to focus on “skills, scale and speed”. India has the potential to emerge as the global hub for providing skilled manpower to other nations. We can prove to the world that the 21st century belongs to India through self-belief, dedication and discipline.

(Source: Indian Express 15 July, 2020)
Chemical Industry Digest interviewed Mudit Jain, Managing Director of DCW Ltd, a major manufacturer of industrially important inorganic chemicals, to know his views on the impact of COVID-19 crisis on the chemical and allied industries. His views on the crisis and some very radical recommendations he makes, to overhaul the entire Indian economy, so that India can become a leading economic power are published here.

**Transcripts from the interview:**

**Chemical Industry Digest (CID):** What is the impact of the COVID-19 crisis on industry particularly the industry that you are in?

**Mudit Jain (MJ):** This crisis has been back breaking for all industries and many companies and industries may get totally demolished too, unless remedial measures are taken quickly. At the moment, there is total chaos in industry. There is huge demand destruction, across the board, for all industries. Companies, even in locked down situation, have to meet fixed costs like loan repayments, interest costs, salaries and other overheads. And there is no cash flow coming in. Industries have no money to pay and obviously, there will be salary cuts and retrenchments. I am really worried over the situation as there will be massive unemployment. Those who were earning daily wages whether in industry, trade, construction, auto/ taxi services etc. are in dire straits. I am afraid there will be social unrest and even violence if immediate succour is not made available to the severely distressed class.

**CID:** How is your company faring?

**MJ:** We are also adversely impacted, though we are a little lucky, as it is a little less comparatively, mainly because we could keep our plants working, both in Gujarat and in Tuticorin in Tamil Nadu. Though domestic demand is negligible we have been able to manage due to exports, particularly since our plant in Tuticorin is close to the port. In Gujarat our soda ash plant caters to the domestic demand there, while our plant in Tuticorin which produces caustic chlorine products has been mainly catering to exports. Some amount of sodium hypochlorite is also produced which is a good disinfectant, and particularly important now, for disinfection against the coronavirus. We are also shipping caustic soda to Nalco in India. So overall we are less affected.

**CID:** To what extent is the lockdown affecting the business and what is your opinion on lengthening the lockdown?

**MJ:** Very frankly, I am against the lockdown. This has only led to crippling the industry and business with demand destruction. As Rajiv Bajaj of Bajaj Auto said, lockdown is a solution looking for a problem. Lockdown should not have been imposed at all. Instead all things should have been kept open and running, while at the same time putting in place stringent protocols for movement of people, on social distancing, on transportation and travelling, on meetings and assembly of people, on the working of offices and industries etc. And the vulnerable sections of the population like the elderly and those with co-morbidities protected. This would have ensured that the challenges on the health front against the virus was taken care of with minimal damage to business & industry. But now with the lockdown gone on for more than 50 days, there is no sight of flattening the curve with cases of infection spiking every day, while at the same time it has played havoc with the economic situation for everybody, for individuals, for business & industry and even for the government, as government revenues have also been hit hard.

India is a densely populated country with our urban areas swamped with slums, where physical distancing, etc. is very difficult. The sudden announcement of the lockdown has created huge problems for migrant labour and daily wage earners whose main concern is not the threat of corona virus but their day to day livelihood without which they would die of hunger. Their problems have been aggravated by the lockdown. The migrants leaving in huge numbers will also create problems for the resumption of business and industry in the respective states.

**CID:** As an industry and through industry associations and bodies what recommendations have

Mudit Jain is one of the co-promoters and Managing Director of DCW Limited. He is a former President of the Alkali Manufacturers Association of India (AMAI). He has an MBA from The Wharton School of Business, USA, and has over 30 years of experience in running an industry.
CID: Do you see any silver lining from the crisis? There are reports that because of this crisis the entire world is not happy with China and therefore India has the opportunity to attract fresh investments and MNCs planning to relocate from China. What is your take on this?

MJ: The only silver lining I can see is that all industries are in the same boat. I have my doubts whether companies will relocate to India from China. Of course, due to the Covid crisis there is a huge outcry to ban companies from China or not to buy products from China. I feel these are all kneejerk reactions. Why ban or restrict any company from anywhere coming to India? Whoever is willing should be allowed to come to India and set shop here. Let Indian companies compete with them. If foreign companies do anything wrong here we have laws to tackle that. Companies will come to India only when there is an enabling ecosystem for manufacturing in India. Infact, Indian companies instead of expanding or putting up projects here are setting up projects overseas. Some are even scaling down their operations here, setting up manufacturing overseas and importing those products into India. We should ponder why this is happening.

CID: If you have to suggest few steps in the order of priority that the government has to take to combat the economic meltdown that is taking place due to the crisis, what would these be?

MJ: As you know the pandemic is unprecedented which has caught the world unawares and brought on an economic catastrophe of titanic proportions not seen since the great depression that started in the USA in 1929.

So we need radical and revolutionary steps to tackle this situation; incrementally addressing the economic crisis will not help much.

In fact, we should consider this crisis as an opportunity to totally revamp our economic policy, course correct and create a very enabling economic ecosystem for business & industry to flourish in India.

With this in mind, I am recommending some important steps that ought to be taken – and which can be debated – which I strongly feel, if implemented will make India an economic giant with a 100% increase in our per capital income.

1. Formation of A Body on the lines of MITI In JAPAN

Japan after it was devastated in the Second World War, created the Ministry of International Trade & Industry (MITI) to cooperate with business & industry for it to grow. The results have been spectacular with Japan pioneering the Total Quality Movement (TQM) for excellent manufacturing techniques and becoming a world power with the automobile industry in the 1970’s and electronics in the 1980’s. India can learn a lesson from Japan and set up a similar type of body under headed by the Prime Minister and comprising of experts from various fields who will will recommend and create the policies to be implemented. Such MITI type bodies should be formed in all possible areas for industry, agriculture, healthcare, education, sports and so on. Such bodies will provide tremendous growth impetus for all these areas.
2. Abolishment of All Indirect and Direct Taxes

The government need not give any stimulus instead abolishing all taxes will be the biggest and best stimulus the government can provide to its people in these financially crippling times. All indirect taxes like GST and other levies and cesses, capital gains tax, STT and CTT in the stock market and direct taxes like income tax and company taxes should be abolished. Other economic packages announced will not be of much help and will not be necessary.

In this way, money will be in the hands of the public and the velocity of circulation of money will be much faster leading to greater consumption than if the government spent the money.

It is like building many check dams rather than one gigantic dam which requires much less capex and maintenance costs and is also more doable and better for the economy. The government can still meet its expenses by drastically slashing its expenses across the board by a detailed TQM system of implementation as being done in leading corporates. In addition, the government can rely on the receipts of its public sector undertakings which are many and very big and also charge nominal fees for various services rendered such as toll tax on highways, visa fees etc.

3. Print Money and Utilize in Developing Infrastructure

In these extra ordinary times, the government should throw the rule book away and focus on what needs to be done. As management experts have said it is more important to do the right thing than doing things right. The money so printed should be only utilised for infrastructure creation for roads, ports, airports, sewage plants, desalination plants etc. This will not lead to any inflation. Much needed huge and essential infrastructure will be created which the private sector cannot do with its limited resources.

4. Special Emphasis on Export Promotion

It will take a long time for the Indian economy to limp back to normalcy and there will be a chicken and egg situation on whether to produce if there is no demand and how to create demand in the first place. The world is a huge market but India having less than 2% market share with services occupying the major proportion. To encourage exports and even local production, industry can become competitive if inputs supplied to it by government companies are in line with international prices. For example, state electricity boards can easily reduce their tariffs by 20% by becoming more efficient. A report mentioned that there is over 40% power loss and theft from generation to transmission. Oil companies should have import parity pricing for furnace oil as per policy laid down in the 1990’s, but not being followed. Interest rates by public sector banks should be reduced to 5% for both working capital and term loans and for exports to 1%. In addition, export incentives like MEIS should be hiked to 10% for Indian companies to be competitive in the international markets. All these measures can make Indian industry competitive and increase production.

In the last 20 years, many Indian companies have invested overseas as the costs and business climate in other geographies have been better and also many companies have closed down in India due to cheaper imports for no fault of theirs. For example, the freight costs from China to South India is approximately Re.4000 per ton whereas from South India to Delhi is Rs. 6500 per ton, all due to high taxes on petroleum products.

5. Approvals from Regulatory Authorities to be outsourced to Professional Agencies

Any regulatory approvals from various bodies either at the central or state level should be outsourced to expert agencies and the government should only collate and collect a nominal fee for giving it authenticity. For example, approvals from the factories inspectorate can be outsourced to chambers of commerce or engineering standards companies; labour matters to HRD firms and trade unions etc. This will be a totally new way of doing business, as it will eliminate state and central government interference and make them mainly collators of information. This will also professionalise the mechanism of working and enable the governments to sharply reduce their costs in governing this activity.

6. Encourage Employment by Companies

Another revolutionary proposal is for the government to incentivise firms employing more people. For example if a company employees 100 people, it should be entitled to cash incentives and a fast track approval system. Unemployment is going to sharply increase in this new world with emphasis on digitization, physical distancing, robotics, artificial intelligence etc. By encouraging employment it will curb social unrest and bring peace to civil society by developing the potential of people who would otherwise be idle.

I feel the above recommendations, if implemented will be transformational for India, which of course will need good leadership and good governance from central as well as state governments. As you know many Indians have been heading global corporations like Google, Microsoft, IBM, Adobe Inc etc. It is high time we created such global giants from India.

(Reproduced with permission from Chemical Industry Digest, 15th July 2020)
Incident

Around 7.30 pm on 6th July 2020, panic prevailed in and around the Jal-Kal campus, where raw water lifted from river Ganga is treated before supplying it to city. People started having difficulty in breathing as Chlorine gas leaked in the Bhelupur area of Varanasi. Apart from a Jal-Kal’s pump superintendent, five other persons in the vicinity of this campus fell unconscious. The incident happened when a cylinder filled with chlorine gas leaked in the scrap store of the campus.

Chief Medical Officer, Dr. V. B. Singh confirmed that six persons were admitted to SPG divisional hospital and three of them were further referred to BHU hospital as their condition deteriorated. On Tuesday, the condition of all these patients was stabled.

Incident Control

Municipal Commissioner, Mr. Gauran Rathi formed a team comprising Chief Engineer of UP Jal Nigam and Additional Municipal Commissioner-III to investigate the matter and asked it to submit the report. Municipal Commissioner stated that necessary action will be taken accordingly after the submission of the investigation report by the team.

Mr. Ravindra Jaiswal, Minister of Uttar Pradesh also took stock of the situation on 7th July 2020 and asked officials to ensure proper investigation.

To handle the situation, Bhelupur cops stopped the movement of traffic between Kamaksha and Bhelupur crossing while the fire fighters started the operation to minimise the effects of chlorine spread in air. After exercising hard for two hours, the fire fighters succeeded in checking the leakage from a cylinder.

Root Cause Analysis

After initial inspection of the site, the Municipal Commissioner, Mr. Gauran Rathi said the leakage had taken place in the cylinder, which had been declared obsolete several years back and was lying in the scrap store of Jal-Kal campus.

Recommendations

1. Cylinder should be returned to the company or the party if it is rejected.

Source: The Times of India dated 07.07.2020
Jal Jeevan Mission - An Update

32 lakh households provided with piped water post lockdown: Union minister

*The Economic Times* | 28 July 2020

Jal Shakti Minister Shri Gajendra Singh Shekhawat informed that thirty-two lakh households have been provided with piped water in the post-lockdown period under Jal Jeevan Mission, also helping create employment for over 42,000 people in six states.


Jal Jeevan Mission in Srinagar to be completed before August 15

*Greater Kashmir* | 28 July 2020

The Jal Jeevan Mission, an initiative by GoI, aimed at ensuring access to piped water to each individual household in rural areas, will be completed before August 15 in Srinagar.


Action Plan for Jal Jeevan Mission finalised for Anantnag

*5 Dariya News* | 27 July 2020

District Development Commissioner (DDC) Anantnag, Shri K K Sidha convened a meeting of officers and Engineers of Jal Shakti Department to finalise the Action Plan for Anantnag district. This is part of GoI flagship programme, has been launched by the Ministry of Jal Shakti, with an aim to provide the drinking water facility to every household under the slogan “Har Ghar Nam se Jal”.


Arunachal: West Siang district finalizes 92 schemes under Jal Jeevan Mission

*North East News* | 25 July 2020

The West Siang district water and sanitation mission has finalized 92 schemes under the Jal Jeevan Mission annual action plan for 2020-21 for the district. The finalized schemes here would cover 573 households and would be implemented at an estimated cost of Rs 38.5 Crores. The schemes were finalized during a meeting held under the chairmanship of deputy commissioner Moki Lobi here.


Four million tap connections made operational across states amid lockdown: Jal Shakti Ministry

*The Economic Times* | 18 July 2020

The flagship government programme to provide functional tap water connection to every rural household has seen hectic activity in June, especially in 116 districts that recorded maximum migrant labourer returns, even as the industry is slowly sputtering back into activity after the lockdown. Latest data from the Jal Shakti ministry shows that nearly four million connection were made operational across states under the Jal Jeevan Mission between April 1 and June 30, and more than 8,100 crore central funds were pumped in for the same.


Assam decides to engage returnee youths in Jal Jeevan mission

*The Economic Times* | 07 July 2020

Assam has decided to engage returnee youths from other states in the implementation of the Jal Jeevan mission in the state. Union Jal Shakti Minister Sh. Gajendra Singh Shekhawat discussed with Chief Minister Sarbananda Sonowal about the status of implementation of Jal Jeevan Mission in the state. Our Prime Minister Shri Narendra Modi has set target of providing piped water to every rural household by 2024.

After MGNREGA, govt to pump in ₹30,000 Crores under Jal Jeevan mission

The Economic Times | 15 June 2020

After the Mahatma Gandhi National Rural Employment Guarantee Act, the Centre’s flagship scheme Jal Jeevan Mission is set to pump big money in the rural economy in the post Covid-19 scenario. About ₹30,000 crore will be made available to states in 2020-21 under the Jal Jeevan Mission. The scheme aims to provide a functional tap water connection to each of the over 14.8 crore rural households.


West Bengal, Meghalaya going slow on Jal Jeevan Mission- Centre tells the two states

The Economic Times | 10 June 2020

Jal Shakti Ministry conveyed to both states West Bengal and Meghalaya that they have been lagging behind considerably in meeting their Jal Jeevan Mission (JJM) targets and spending allocated funds. The ministry is pushing all states to immediately start works related to water supply and conservation in villages to help generate jobs for migrants returning from cities due to COVID 19 and is currently assessing each state’s proposed annual action plan under the JJM.


Madhya Pradesh gets Rs 1,280 crore from Centre under Jal Jeevan Mission

The Economic Times | 11 June 2020

In a bid to provide adequate drinking water to rural households, the Centre has approved Rs 1,280 crore for the implementation of Jal Jeevan Mission (JJM) in Madhya Pradesh for 2020-21. The state government had presented an annual action plan on drinking water and sanitation aimed at providing adequate drinking water to rural households in the state, said Malay Shrivastava, Principal Secretary of Public Health Engineering Department.


UP starts work on Jal Jeevan Mission with 2022 target, Shekhawat promises unconditional support

The Economic Times | 06 June 2020

Emerging from lockdown, Uttar Pradesh is among the first states to begin work on the Centre’s Jal Jeevan Mission. UP has started the process of appointing implementation support agencies that will bring drinking water to 13 crore people in the state. The Centre has set 2024 as the nationwide deadline to provide a Functional Household Tap Connection (FHTC) to every rural household but UP has resolved to complete the same by 2022.

An explosion on October 13, 2002, propelled large fragments of debris offsite, some landed near crude oil storage tanks. Three people were injured, but fortunately, no fatalities occurred.

Steam leaking through manual block valves heated crude Mononitrotoluene (MNT) inside a vacuum distillation column, which was shut down and thought to be isolated. The column contained about 1,200 gallons (4.5 m³) of MNT, an energetic and reactive material which can decompose violently when heated. The material decomposed over several days, resulting in a runaway reaction and explosion. Debris from the explosion caused a storage tank fire and numerous smaller fires both onsite and offsite.

Low product demand delayed start up, but the MNT column was kept in total reflux, until the plant-wide shutdown was completed. A fire elsewhere caused operators to isolate heat sources to all columns including the MNT column by closing manual steam block valves and control valves. However, the valves on the MNT column were leaking through, and the temperature of the material in the MNT column did not drop but continued to rise, exceeding 450°F (232 °C) in about 8 days. There was no alarm, and there is no evidence that Operations personnel actively monitored the column temperature control system.

### Did You Know?

- Some chemicals, especially when heated, can decompose, creating more heat and even exploding.
- Chemical reactions may continue at a slower rate below the usual reaction temperature and reach decomposition conditions given enough time.
- Chemical reactions can take place where they are not expected – like distillation columns or storage tanks.
- During shutdowns there may be distractions; crews may be performing different tasks or be working in different areas.
- Procedures may lack detail for non-standard operations like temporarily idling or shutting down with materials still in the process.

### What Can You Do?

- Follow procedures and equipment isolation plans when equipment is shutdown.
- During shutdowns or temporary operations, continue to monitor process parameters and alarms.
- If chemicals are left in idled equipment, they need to be monitored and kept within safe limits; if those limits are exceeded, take appropriate action and notify the supervisor.
- If you notice block valves leaking through, have them repaired or replaced. Do not expect flow control valves to serve as block valves.

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Though Covid-19 and the ensuing mayhem has left the global and Indian economy battered, a survey by auditing major PwC reveals that more that 80% of business expect markets to recover by June next year as companies focus on crisis management, operational efficiency and innovation.

PwC India surveyed 225 CXOs across industries between June 17 and July 10 to assess the impact of Covid-19, the challenges it poses, new paradigms and interventions being considered by business leaders.

They attribute this resilience to operational flexibility, robust crisis management and process/product innovation. For many, this is a result of work done in the pre Covid-19 era.

The report suggests that infrastructure, real estate, industrials, retail, hospitality and media & entertainment suffered significant revenue decline due to the crisis. Collapse in demand, supply chain disruptions and liquidity constraints were the top reasons for decline.

Sectors like IT, healthcare, pharma, telecom, utilities and consumer essentials were somewhat resilient. Crisis management and agility to adapt to the changing market were the key for resilience, it added.

US GDP contracts by 32.9% in Q2, worst economic decline on record

The US economy contracted at its steepest pace since the Great Depression in the second quarter as the Covid-19 pandemic shattered consumer and business spending, and a nascent recovery is under threat from a resurgence in new cases of coronavirus.

Gross domestic product collapsed at a 32.9 percent annualized rate last quarter, the deepest decline in output since the government started keeping records in 1947, the Commerce Department said. The drop in GDP was more than triple the previous all-time decline of 10 percent in the second quarter of 1958. The economy contracted at a 5.0 percent pace in the first quarter. Economists polled by Reuters had forecast GDP plunging at a 34.1 percent rate in the April-June quarter.

Trying for early solution on MEIS; in dialogue with requisite authorities: Piyush Goyal

The commerce and industry ministry is trying to find a solution on the issue of export incentive scheme MEIS without having a “serious” impact on government finances, Union Minister Piyush Goyal said. The commerce ministry has blocked the online system for exporters to apply for availing tax incentives under the MEIS (merchandise export from India scheme) from July 23, as the Department of Revenue decided to limit the benefits under the plan at Rs 9,000 crore for April-December 2020.

The Department of Revenue has also asked its commerce counterpart to review the coverage of export incentive scheme MEIS, so that the fiscal benefits under this programme can be brought down to Rs 9,000 crore this fiscal as it has not yielded “desired” results.

It has also requested the commerce department that MEIS incentives should be targeted and need calibration in a manner that it promotes exports instead of spreading incentives in a manner that does not yield the desired result. Under MEIS, the government provides duty benefits depending on product and country.

Rewards under the scheme are payable as percentage of realised free-on-board value and MEIS duty credit scrip can be transferred or used for payment of a number of duties, including the basic customs duty. The MEIS scheme, introduced in April 2015, will be wound up by December 31, 2020, and the government has already announced the Remission of Duty or Taxes on Export Products (RoDTEP) scheme to replace MEIS.

According to an office memorandum of the Directorate General of Foreign Trade (DGFT), the Department of Revenue in May had conveyed that it may not be feasible to exceed MEIS allocation beyond Rs 9,000 crore for 2020-21 (up to December 2020).
China Imports All-Time High PVC From India In June Amid Border Tension In Eastern Ladakh

Swarajyamag | 29 July 2020

Giving rise to an anomalous situation, China imported record high 27,207 MT of PVC from India in June at a time when the two countries are locked in a tussle at the border amid calls for reducing trade flows. This is more than five times compared to 5,174 MT recorded in May as India accelerated PVC exports during the Covid-19 lockdown, Global Rubber Markets reported. It is a rare move as the Indian PVC market is net short by close to 2 million m/year. During the lockdown, India’s PVC demand plunged, prompting cancellation of PVC deliveries to India. Suppliers had to move their cargoes to China to clear excess supplies, it added.

Looking forward, market sources said China’s PVC imports from India would likely slow as the lockdown ended early-June. For June delivery, market participants negotiated in May.

Polyvinyl Chloride (or PVC for short) is the third most widely produced plastic in the world following polyethylene and polypropylene, and it is used in a wide variety of applications in industry, construction, agriculture, consumables, packaging, power production and public utilities. PVC is highly durable, resistant and flexible, making it useful for use in clothing, pipes, insulation and many other areas.

To curb imports, Indian companies are submitting proposals to the government on ways to reduce import dependence on China.

**Single window nod for industry soon**

*The Hans India | 28 July 2020*

The central government will soon set up a single window system for clearances and approvals for industries in the country, Commerce and Industry Minister Piyush Goyal said. This would be a genuine single window and all the State governments concerned and Central ministries are being taken on board for the system.

Besides, Goyal pointed out that the Centre is working on creating a land bank, for which six states have already given their consent. According to a ministry statement, Goyal said that the potential investors would then be able to locate and identify the land banks from their distant offices and finalise the location of industries, without frequently visiting the offices of land-owning agencies. On the issue of further easing and speeding up the process of approvals for industry and investments, the minister referred to the recent decisions of the Cabinet to set up an ‘Empowered Group of Secretaries’ to take decisions on various schemes and projects.

Furthermore, Goyal said the government had initially identified 12 industrial sectors to focus upon, and the same has been expanded to 20. “These sectors include furniture - standard as well as special furniture, air-conditioners, leather, footwear, agro-chemicals, ready to eat food, steel, aluminium, copper, textiles, electric vehicles, auto-components, TV set-top boxes, CCTVs, sports goods, ethanol manufacture and bio-fuels, and toys.”

**UK plans tariff cut on Indian exports**

*Hindustan Times | 27 July 2020*

Seen as a ‘building block’, the UK’s new Global Tariff (UKGT) schedule is expected to boost trade by reducing tariff on Indian exports by up to £40 million per year, as the Boris Johnson government plans a trade scale-up when Brexit is completed on December 31.

This and other key issues were discussed at the 14th bilateral annual meeting of the Joint Economic and Trade Committee (Jetco), which is usually less noticed but assumed importance given that it is the last such meeting before the UK begins trading as an independent country, post-brexit, from January 1.

Five sectors have been identified for enhanced focus with India: life science and health, information and communications technology, food and drink, chemicals and services. Bilateral trade is currently worth £24 billion, but India is not yet among the UK’S top 10 trading partners.

Officials say the idea is to build towards an eventual signing of a free trade agreement with India, which has often been mentioned by Prime Minister Boris Johnson and other pro-brexiters as a key market.

**Limit China FDI to 25%, says DEA**

*Times Now News | 24 July 2020*

The department of economic affairs has recommended that the beneficial ownership threshold for foreign direct investments should be set at 25% to determine if they need to go through an approval process amid government efforts to restrict Chinese investments in India.

Tarun Bajaj, secretary DEA, said that the department has recommended beneficial ownership could be set as per its definition under foreign portfolio investor (FPI) norms and Prevention of Money Laundering Act (PMLA). This recommendation has been made to the Department of Promotion of Industry and Internal Trade (DPIIT).
Under FPI norms beneficial ownership is set at 25% of the total assets, or on the basis of the fund manager. Under PMLA the threshold is 25%.

**Identified 20 sectors where India can become global supplier: Piyush Goyal**

*Times Now News | 23 July 2020*

The government has so far identified 20 sectors where India can meet domestic demand as well as become a global supplier, Commerce and Industry Minister Piyush Goyal said. He said industry body FICCI and other associations are working with the government in this regard.

These sectors include food processing, organic farming, agrochemicals, electronics, industrial machinery, furniture, leather, auto parts, and textiles, among others.

**India to offer production linked incentives to boost manufacturing**

*Deccan herald | 23 July 2020*

India is working on offering production linked incentives for up to five sectors to boost domestic manufacturing, a top finance ministry official said, bolstering efforts to attract new investments in the coronavirus-stricken economy.

Asia’s third-largest economy is expected to contract by as much as 10% in the current fiscal year beginning April, some private economists’ estimate, after the outbreak crippled business and consumer activity since late March, compared to government’s earlier target of about 6% growth.

The government has announced a raft of measures including direct food subsidy to nearly 810 million people and credit guarantees of 3 trillion rupees ($40.17 billion) on loans to small to small businesses.

Tarun Bajaj, economic affairs secretary at the Ministry of Finance, told a virtual conference that incentives would be offered to sectors to push manufacturing and help struggling industries.

Bajaj didn’t specify the sectors that may be eligible for incentives. The government earlier announced production linked incentives for large scale electronic goods makers for five years, to attract investments in mobile phone manufacturing and electronic component units.

Incentives have also been announced for pharmaceutical companies for production of bulk drugs and on medical devices. Reuters earlier reported that India is drawing up an incentive scheme for the autos sector aimed at doubling exports of vehicles and components in the next five years. Industry and government sources said sectors such as textile and food processing manufacturers could be offered production linked incentives.

The latest data on 14-15 economic indicators including railway freight and tax collections showed a pickup in economic activities, Bajaj said, adding the government was open to borrow more from the market to meet spending targets for infrastructure projects.

**As NGO seeks clarity on environmental impact of FGDs, green body refers matter to CPCB**

*The Times of India | 22 July 2020*

Following an application moved by Veterans Forum for Transparency in Public Life, an NGO seeking clarity on the environmental impact of the Flue Gas Desulphurization (FGD), the National green tribunal has referred the matter to the Central Pollution Control Board.

The NGO had recently filed an application in National Green Tribunal (NGT) against the Ministry of Environment and Forest and Climate Change for notifying emission norms for thermal power plants without scientifically assessing their likely impacts on improving the ambient air quality and the likely environmental impacts of installation of Wet Lime FGD for controlling SO2 emissions from thermal power plants.

The NGO through its application has also requested for review of the present status by MOEF&CC considering that the SO2 emission norms for coal-based plants notified by MOEF & CPCB were based on two considerations, first to keep SO2 gas ground level concentrations (GLC) below prescribed safe limit and second to reduce secondary particulate pollutants- Sulfates formed from SO2 emission from these plants.

After hearing the matter, the NGT felt that it was more of technical issue and asked the NGO to approach Central Pollution Control Board for consideration of their viewpoint.

The Environment Ministry has notified revised emission norms for coal-based power plants in the country specifying limits for SPM, SO2, NOx and Mercury. Most of the power plants are complying with the prescribed emission norms for SPM, NOx and Mercury. However, majority of them are still far away from meeting the emission norms for SO2. The timeline for complying these norms was 31st Dec 2019 for Power plants in Delhi-NCR region and up to Dec 2022 for other power plants.

The NGO in its application argued that analysis of available air quality data indicates that though the prescribed safe limit of ambient SO2 GLC is 80 µg/m3, the actual GLC is less than 20 µg/m3 in almost all cities and all areas of India. Delhi has SO2 GLC of less than 20 µg/m3 even during the critical November and December months which are observed as peak air pollution time for national capital region.
It is fact that in presence of favourable meteorological conditions some portion of SO2 gets converted into Sulfates, the secondary particulate matters. However, till date, there is no detailed study carried out for assessment of which Indian cities and places polluted by Sulfates arising from specific coal-based power plants or other large combustion sources. Thus, it necessitates to carry out plant specific studies for analysing the contribution the coal-based plant(s) on the air pollution of nearby Cities and Metros.

NGO further stated that enforcing SO2 emission norms for all power plants in India shall require capital expenditure to the tune of one Lakh Crore Rupees (14 US Billion Dollar) and most of which will go to foreign companies (mostly Chinese) and is approximately 3% of total Forex reserves of the Country (500 US Billion Dollar reserves). Besides all these coal-based power plants shall run out of life over the next 15 to 20 years and some even in less than 10 years thus making this large investment as national wastage without accruing any environmental benefits. (coal-based plants shall be replaced by Green energy).

**Commerce minister Piyush Goyal proposes ‘preferential trade agreement’ with the US**

*Hindustan Times | 21 July 2020*

Commerce minister Piyush Goyal proposed a “preferential trade agreement” with the US covering a limited number of goods and services as the next step after the signing of a “quick” trade deal that was just a few phone “calls” away and before the conclusion of a more ambitious Free Trade Agreement (FTA) that could take years.

India and the United States have been working on a limited trade deal to expressly address the more urgent issues of concern to both sides and have said they planned to start negotiations on a broader Free Trade Agreement (FTA) later in the year, either before or after US elections in November.

No other details were available of this interim trade pact. But people familiar with trade talks between the two sides, which have been on a long time but with renewed urgency for the last one year, said the idea is to keep the “ball moving” by continuing to address trade issues in small and manageable and not wait for the FTA, which will be a long and tedious process.

The “quick” deal, as the minister described it, has been ready and waiting to be signed, but is being held over a “frustrating” desire from the US side to “squeeze” out as much as it can.

According to the same people familiar with the talks, the United States has pushed for greater market access in agriculture, dairy and medical devices sectors in the limited trade agreement being finalised.

India has sought restoration of preferential trade benefits under the US Generalized System of Preferences (GSP), which were terminated by the Trump administration in summer of 2019 to force India’s hand.

President Donald Trump’s insistence on trade deficit reduction and reciprocity precipitated a trade crisis between the countries, bringing long simmering issues to a head. He first slapped higher tariff on steel and aluminium imports from India and then evicted India from the GSP programme, which accounted for $6.3 billion worth of Indian exports to the United States in 2018, roughly 12% of total Indian goods exports to the United States.

**NGT asks CPCB to ensure states, UTs ban use of pet coke, furnace oil**

*The Economic Times | 18 July 2020*

The National Green Tribunal (NGT) has asked the Central Pollution Control Board (CPCB) to ensure that states and Union Territories (UTs) ban the use of pet coke and furnace oil as fuel to prevent damage to the environment and public health.

A bench of the NGT, headed by its chairperson AK Goel, sought an action taken report (ATR) from the CPCB within four months and listed the matter for further hearing on January 15, 2021.

The tribunal was hearing two petitions, filed by Sumit Kumar and Amarjeet Kumar, seeking regulations and to control the use of pet coke and furnace oil as fuel to prevent damage to the environment and public health.

The tribunal has observed that the Supreme Court, in its order dated October 24, 2017, banned the use of pet coke and furnace oil in the national capital. On November 17, 2017, the top court had suggested other states and UTs take similar measures.

Earlier, the NGT had directed the CPCB to adopt measures for regulation and control.

The green tribunal had noted there are huge emissions of SO2 (sulphur dioxide) and other pollutants on account of the use of pet coke and furnace oil by the industries. It also noted that some states are continuing using it. The tribunal has directed the industries to switch over to alternatives and cleaner fuels.

“Orders of the tribunal be given effect and CPCB may ensure compliance by issuing such further direction as may
be necessary for the exercise of its statutory power,” the NGT held.

**FIEO demands stern action against untraceable exporters, offers full support to government**

*The Times of India | 18 July 2020*

Exporters body FIEO demanded a stern action against 1,377 exporters who had claimed GST tax refunds of Rs 1,875 crore and are untraceable at their principal place of business.

The Federation of Indian Export Organisations (FIEO) president Sharad Kumar Saraf said that they would offer full support to the government as such activities impact the image of the exporting community.

According to an official, this was detected in a massive verification exercise the government initiated after identifying 7,516 “risky exporters”. Exporters are identified as “risky” on the basis of specific risk indicators based on customs, GST, income tax and DGFT data. The identified risky exporters’ information is shared with the CGST formations for physical and financial verification.

According to trade experts, many exporters have stated that they have been categorised as “risky” as their suppliers or sub-suppliers have not deposited the GST. “How long an exporter can go to check credentials of their suppliers. CGST Act provides for ratings of suppliers and such errant suppliers should have either been given a low rating or black listed forewarning exporters. Unfortunately, this has not been done in the last three years adding to exporters’ problems and pushing them into a risky tag,” an expert added.

Saraf said that while the number of untraceable exporters as a percentage of total number of exporters is not much yet untraceability of such a large number of businesses requires concerted efforts to trace them and bring them to books. The DGFT also keeps their email, telephone and bank details including the photograph of the person who applies for IEC.

“If they do not respond, DGFT should initiate action to suspend/cancel their IEC making them ineligible for further exports/imports and authorities should initiate proceedings against them to recover government money,” Saraf added.

**Equalisation levy not targeted at US cos: Govt**

*Times News Network | 18 July 2020*

The government has told the US authorities that the equalisation levy on e-commerce supplies and transactions is nondiscriminatory and is in line with India’s commitments to World Trade Organization and global tax agreements.

The government stated this while expressing regret at the initiation of an investigation by the US Trade Representative. India, along with the UK and the EU, is facing a US probe for imposing digital sales tax, an issue on which the US is threatening retaliatory trade action against France.

The government has argued that the concept of equalisation levy in India emerged as a result of deliberations of the OECD Base Erosion & Profit Shifting (BEPS) project, with the report accepted by India and other members of the global body. Equalisation levy is applicable on companies like Google, Netflix and Amazon and the 2% tax kicked in from April. India has also pointed to a recent US court ruling, which held that the physical presence of an entity is not required for levy of sales tax.

**Trade surplus could be more a reason for alarm than rejoicing: Economists**

*Business Standard | 18 July 2020*

Economists are not enthused about the trade surplus in June, achieved for the first time in 18 years, as the underlying cause could be an alarming drop in demand — something that’s not good for economic growth.

The surplus is “certainly not something to rejoice about. Rather, it signals severe slowdown in economic activity weakening the demand for core imports — that is non-oil non-precious metals imports,” said Rupa Rege Nitsure, chief economist of L&T Finance Group. “One can rejoice about trade surplus only if it is due to exports being higher than imports. In today’s circumstances, it is a negative rather than a positive signal,” Nitsure said.

In June, exports fell for the fourth month in a row, albeit at a lower rate.

Merchandise exports fell 12.41 per cent in the month, albeit the rate was lower than the 36.47 per cent seen in May and 60.28 per cent in April. Imports fell 47.59 per cent in June, against 51.05 per cent in the previous month, and 58.65 per cent in April. Imports of gold, petroleum products, engineering goods, coal and machinery shrank.

A decline of 41.37 per cent in June, against 43.13 per cent in May, indicated that a recovery in industrial production will take time, say economists. Exports of $21.91 billion and imports of $21.11 billion resulted in a surplus of around $800 million in June’s trade balance, the first such instance since January 2002’s surplus of $10 million.

India is likely to post a strong current account surplus in the first quarter of 2020-21. And the trade data indicated that the April-June current account balance could be as much as 3.5 per
cent of GDP in surplus, which would be the largest surplus since March 2004, wrote HSBC India’s chief economist Pranjul Bhandari in a note.

Comparatively lower oil prices will keep providing support to the trade balance and the country can witness a current account surplus this fiscal year, Ghosh said, adding with a high foreign exchange reserve ($516 billion) and a high import cover, rupee can see further appreciation.

India ranks 3rd in global manufacturing locations among 48 nations: Report

Business Standard | 16 July 2020

India ranks third in the list of most-suitable locations for global manufacturing among 48 countries in terms of cost competitiveness and operating conditions, according to property consultant Cushman & Wakefield.

China and the US retain the top two positions, while India has moved one place higher to rank third, the consultant said in its Global Manufacturing Risk Index (MRI) report.

In its annual ranking of the most suitable locations for global manufacturing among 48 countries in Europe, Americas, and the Asia-Pacific, the consultant said India is in top-3 countries this year and an upcoming manufacturing hub globally from an operating conditions and cost-competitiveness perspective.

“In the backdrop of the Covid-19 scenario, the government has reiterated its agenda to launch fresh measures that would give a boost to setting up of a more conducive environment to make India a manufacturing hub.

“At a time like this, India ranking amongst top-3 on the most suitable locations for global manufacturing comes as a shot in the arm for the country,” said Anshul Jain, managing director (India and Southeast Asia), C&W.

From a baseline scenario ranking that looks equally at operating conditions and cost-competitiveness but does not consider the impact from the current pandemic, China retains the top spot, followed by the US at second and India at third positions, the report said.

In cost scenario, India is at 3rd position after China and Vietnam. However, India ranks 30th in risk scenario.

Countries that present lower levels of political and economic risks are ranked higher.

The MRI cost scenario places greater emphasis on cost reduction to give a higher score to countries where operating costs, including labour, are lower. While China retains its lead position, Vietnam and India jumped to second and third positions, respectively, it added.

The annual Global MRI scores each country against 20 variables that make up the three final weighted rankings that cover conditions, cost and risk.

The MRI 2020 includes analysis of the impact of Covid-19 on the global manufacturing sector and ranked countries by their projected ability to restart their manufacturing sectors once confinement measures are relaxed and business starts to return to normal.

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NGT asks govt to ban RO-purifiers that demineralises water

The Hindu | 14 July 2020

NGT had earlier said the delay in compliance with its order is causing harm to public health and environment and it be complied with expeditiously.

The National Green Tribunal directed the Ministry of Environment and Forests (MoEF) to issue by the year-end a notification banning RO purifiers where total dissolved solids (TDS) in water are below 500 milligrams per litre.

A bench headed by NGT Chairperson Justice Adarsh Kumar Goel granted more time to MoEF after it informed the tribunal that the exercise could not be completed due to coronavirus (COVID-19) pandemic.

“Even after one year, further extension of time has been sought by MoEF on the ground of lock-down. Let necessary action be now completed positively by December 31, 2020,” the bench said. The NGT had earlier said the delay in compliance with its order is causing harm to public health and environment and it be complied with expeditiously. The Ministry had in January sought four months for executing the NGT order.

The MoEF in its plea had said that for effective compliance of the order four months are required -- two for wide circulation of draft notification for inviting comments, and two for incorporation of comments, finalisation of notification and obtaining approval from Ministry of Law and Justice. The matter is listed for next hearing on January 25.

India GDP to contract 7.5% if Covid-19 vaccine delayed

Live Mint | 13 July 2020

A longer wait for a vaccine against COVID-19 virus may lead to a contraction of up to 7.5% in the Indian GDP in FY21, a foreign brokerage said.

Economists at Bank of America Securities also revised down their base case estimates on the real GDP within a week, and now expect it to contract by 4% because of a drop in economic activity.

Many analysts are expecting the Indian economy to contract by 5% in FY21 as a result of the nationwide lockdowns, with some also estimating
a contraction of up to 7.2% in the GDP.

"India's real GDP will likely contract by 7.5% if the global economy has to wait for a vaccine discovery for a year," the BoFA analysts said, calling this as the "bear case".

A base case is the most probable case or expected case. While a bear case means a typically pessimistic case.

The analysts, who were earlier estimating a 5% contraction in the worst case scenario, said every month of lockdown is costing 1 percentage point from a yearly growth perspective for the Indian economy.

### Not against imports, have to import products where we have difficulty: Piyush Goyal

*The Economic Times | 13 July 2020*

Commerce and industry minister Piyush Goyal on Monday said India is not against imports and will need to import certain products as every country can't produce everything.

His statement assumes significance in the wake of the government erecting barriers to curb imports especially those from China.

Goyal also said that the government has been identifying sectors to enhance exports and substitute imports. It has identified 12 industry sectors to promote Indian manufacturing including food processing, iron and steel, electronics, industrial machinery, furniture, auto parts, and leather and footwear.

### Industrial output index down 34.7%

*Financial Express | 11 July 2020*

The index of industrial production (IIP) plunged to 88.4 in May from 135.4 a year before, according to official data. This represented a 34.7% contraction, but government sources cautioned against making the year-on-year comparison, saying the May 2020 index may undergo significant revision, including more inputs.

The year-on-year contraction in output was recorded at 57.6% (revised) in April. The government, however, said the May IIP data indicated "a graded pickup in industrial activity in the economy. Industrial production had shrunk 18.3% y-o-y in March when the lockdown was announced, but it was only in April when the first full-month impact of it was experienced by industry. The IIP is expected to recover substantially in June, as lock-down-related curbs were lifted, facilitating the resumption of manufacturing."

The government didn't announce the rate of IIP contraction and just released the index reading for May. Senior government officials also highlighted that any comparison with the (year-on-year) growth rates for earlier months would be inappropriate, given the exceptional circumstances. Analysts, too, cautioned against reading too much into the latest data. In May last year, industrial output had risen 4.5%.

### Non-tariff barriers likely on 350 items

*Business Standard | 11 July 2020*

The government is considering import restrictions on more than 350 items, including electronic goods, toys, furniture, and textiles, by putting in place non-tariff barriers to support domestic industry. Steps such as introducing an import-monitoring system for some and mandatory licensing requirements for others are being examined.

The move is in line with the "Atmanirbhar Bharat" objective, to cut import dependence, and encourage production and demand for locally made goods. Departments and ministries including finance; commerce; micro, small, and medium enterprises (MSMES); and the NITI Aayog are working on a strategy to curtail such imports.

Besides, establishing rigorous product standards is being worked out by the Bureau of Indian Standards (BIS).

Such imports are worth $127 billion. These come largely from China.

Bilateral trade between China and India was worth $88 billion in FY19, with a deficit of $53.5 billion in China's favour.

“"A large chunk of these originate in China and for those goods, we will pursue import substitution,” a senior official said. This will be done mainly by establishing product standards, for which the BIS has been given deadlines.

Items such as processed food, textiles, leather, toys, and furniture — manufactured mainly by MSMES — are being considered for import restriction.

Drugs and items like television, air-conditioners, and refrigerators are also on the list. Monitoring will require importers to register the volumes, values, and the country of origin. A similar mechanism called the Steel Import Monitoring System (SIMS) was introduced in 2019.

Widening the restricted list for imports is being considered. For this permission from the director general of foreign trade (DGFT) is required. The DGFT last month had notified moving imports of certain new pneumatic tyres of passenger vehicles, buses/lorries, and two-wheelers from the free list to the restricted list.

India has hiked duties on over 3,500 tariff lines since 2014. The Department of Commerce has been hesitant to raise import duties, fearing higher prices will hurt manufacturers and exporters who rely on foreign inputs and are facing a liquidity crisis.

The Directorate General of Trade Remedies has been asked to step
up investigation into China’s alleged dumping of products such as steel, chemicals, apparel, and low-value engineering goods.

**Poor safety protocol, breakdown of emergency response led to LG Polymer gas leak: panel**

_Telangana Today | 07 July 2020_

Poor safety protocols and total breakdown of the emergency response of procedures were the root causes of the May 7 styrene vapour leak in the LG Polymers unit at Visakhapatnam, in which 12 people were killed and hundreds fell sick, the High Powered Committee constituted by the Andhra Pradesh government said. Citing multiple inadequacies on the part of LG, the HPC faulted the “slackness of management” for poor safety protocol, poor safety awareness and inadequate risk assessment response that aggravated the situation, a senior government official told PTI. The HPC, headed by Environment and Forests Special Chief Secretary Neerabh Kumar Prasad, submitted a 4000-page report to Chief Minister Y S Jagan Mohan Reddy.

“The accident occurred due to uncontrolled release of styrene vapour from the M6 tank at the LG plant, which qualifies as a major accident under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989. Poor design of the tank, inadequate refrigeration and faulty cooling system, absence of circulation and mixing system, poor process safety management system and total breakdown of the emergency response of the procedures were the root causes of the accident,” the HPC said in its report. The HPC also observed that the factory has “absolutely no stocks of inhibitors and negligible stocks of terminators, which could have been used to minimise the impact of the accident, if not neutralise it. The temperature in the tank rose substantially. It was a tank with small vents. The rise in temperature caused the styrene liquid to eventually vaporize and increase the pressure,” the HPC noted.

The committee also observed that the alarm system (at the plant) was not used despite there being a total of 36 activation points, including one at the factory gate. Using the alarm could have alerted the people in the vicinity (from the impending danger), it added. Director of the Indian Institute of Petroleum (Dehradun) Anjan Ray, Director General of DGFSL Anjan Ray, Director General of DGFSL R K Elangovan, Regional Director of Central Pollution Control Board (Pune) Bharat Kumar Sharma, AP Special Chief Secretary (Industries) Karikal Valaven, AP Pollution Control Board member-secretary Vivek Yadav and others were part of the HPC.

**DGFT to launch new digital platform for delivery of services**

_Chemical Weekly | 07 July 2020_

The Commerce Ministry’s foreign trade arm, Directorate General of Foreign Trade (DGFT), is launching a digital platform for delivery of services like issuance of Import-Export Code (IEC), a move aimed at promoting ease of doing business for traders. The platform will be rolled out in phases and the first phase is scheduled to go live on July 13, the DGFT said in a notice to all members of trade/trade associations, and its regional authorities.

“As part of ‘Digital India’ programme and for ease of doing business, DGFT has undertaken an initiative to revamp its services delivery mechanisms to promote and facilitate foreign trade. The platform will become accessible through the existing website, https://www.dgft.gov.in,” it said.

In the first phase, it said the website will be catering to the services related to IEC issuance, modification, amendment process along with a Chatbot (a virtual assistant) catering to queries of users.

Other online modules relating to Advance Authorisation, EPCG (Export Promotion Capital Goods), and exports obligation discharge, which are part of the next phase, will be rolled out subsequently after the first phase stabilises. Access to the services would be through a username and password based system. The first time logs in, user ID may be created through a registration process on the new platform.

DGFT said digital signature/Aadhaar based e-sign will be required for applying and modifying IEC or adding or updating the IEC-linked users.

The IEC applications and modification process would be suspended from July 10-13 for system integration related works. A person looking to start export import business needs IEC number. It is issued by DGFT. IEC is a 10-digit code, which has a lifetime validity.

**India reviewing around 50 investment proposals from Chinese firms**

_The Financial Express | 07 July 2020_

The Indian government is reviewing around 50 investment proposals involving Chinese companies under a new screening policy, three sources familiar with the matter told Reuters.

Under new rules announced by India in April, all investments by entities based in neighbouring countries need to be approved by the Indian government, whether for new or additional funding. China is the biggest of these investors and the rules drew criticism from Chinese investors and Beijing, which called the policy discriminatory.

The new investment rules were aimed at curbing opportunistic takeovers during the coronavirus outbreak. However, industry executives say a
deterioration in bilateral relations since a clash along the countries’ contested border last month, in which 20 Indian soldiers were killed, could further delay approvals.

Chinese companies’ existing and planned investments in India stand at more than $26 billion, research group Brookings said in March.

‘Nearly 30% cos operating at more than 70% capacity’

The Times of India | 07 July 2020

Nearly 30% of firms are operating at over 70% capacity and 45% companies expect capacity utilisation to accelerate in the months ahead. But they continue to face challenges linked to managing costs, weak demand and financial liquidity, a survey showed.

Unlocking of the economy is starting to have a positive impact on exports, cash flows, order books and supply chains. Up to 22% of the respondents have said that exports have improved in recent times. Another 25% have reported a positive impact of the unlocking of the economy on order books, and 21% have confirmed improvement in cash flows. Nearly 30% of the firms are seeing their supply chains getting back on track, according to the survey undertaken by Ficci and consulting firm Dhruva Advisors.

The survey results further showed that on strategic issues such as M&As and FDI, a majority of firms still plan to wait for 6-12 months before deciding. In the April edition of the survey, 54% of the companies had reported that they would look at M&A in the long term. In June, this figure has moved to 75% — a reflection of the recessionary conditions and fast-changing business dynamics, the survey showed.

On the issue of migrant workers, 53% of the respondents believe that they will come back as businesses have restarted. Industry is requesting the government for provision of concessional transportation, availability of low rental housing near worksites, adequate healthcare and medical facilities and subsidised meal programmes to encourage workers to return.

China central bank slowly buying stakes in Indian cos

The Times of India | 07 July 2020

In mid-April, stock exchange disclosures revealed that the People’s Bank of China (PBoC) had a holding of over 1% in Indian mortgage finance major HDFC. But the Chinese central bank also holds stakes in several other listed companies. However, these are all below the radar since they are less than the 1% threshold limit for open disclosures by companies.

PBoC’s holding in HDFC is worth about Rs 3,100 crore, while in Piramal Enterprises around Rs 137 crore, and in Ambuja Cement about Rs 122 crore. Exactly two years ago, the Chinese central bank had received RBI permission to set shop here. Two recent reports on Chinese investments in India have warned that several funds and investment companies, directly controlled or indirectly influenced by its government, have been eyeing stakes in companies that are strategically important to the economy.

Market sources said the Chinese central bank also has stakes in the Indian arm of a German manufacturing major and another domestic fertilisers major. But these are not disclosed publicly since all they are below the 1% limit.

After PBoC’s stake acquisition in HDFC came to light on April 12, the government, through a press note on April 17, amended foreign investment rules into India. According to a leading Sinologist, there is an old Chinese tactic called “loot a burning house”. “The government policymakers should remember this while formulating the FDI policies.”

A recent Brookings Institute report also put out caveats along similar lines for Indian policymakers. “Chinese companies are emerging as prominent players and investors,” Ananth Krishnan, the author of the report, said. Drawing on several sources within India and from China, the report said that the aggregate Chinese investment in India was a staggering $26 billion with a pledge to invest another $15 billion. However, these figures are likely an underestimation, given the reluctance of the Chinese government to share the data.

Another report by Gateway House, a foreign relations think tank, pointed out how Chinese companies were using the startup route to invest in leading players in several sectors in India.

India’s trade deficit with China reduces to USD 48.66 bn in FY20

The Hindu | 03 July 2020

India’s trade deficit with China fell to $48.66 billion in 2019-20 on account of the decline in imports from the
neighbouring country, according to government data.

Exports to China in the last financial year stood at $16.6 billion, while imports aggregated at $65.26 billion, the data showed. The trade deficit stood at $53.56 billion in 2018-19 and $63 billion in 2017-18.

The main imports from China include clocks and watches, musical instruments, toys, sports goods, furniture, mattresses, plastics, electrical machinery, electronic equipment, chemicals, iron and steel items, fertilisers, mineral fuel and metals.

Over 50 quality control orders (QCOs) and other technical regulations have been notified in the past one year, including those on electronic goods, toys, air conditioners, bicycle parts, chemicals, safety glass, pressure cooker and steel and electrical items. China accounts for about 14% of India’s imports and is a major supplier for sectors like mobile phones, telecom, power, plastic toys, and critical pharma ingredients.

Foreign Direct Investment (FDI) from China in India has dipped to $163.78 million in 2019-20 from $229 million in the previous fiscal, according to the data. India had received $350.22 million in FDI from the neighbouring country in 2017-18 and $277.25 million in 2016-17.

During the period from April 2000 to March 2020, India attracted FDI worth $2.38 billion from China.

In April, the government tightened FDI norms coming from the countries which share land border with India. As per the amended FDI policy, a company or an individual from a country that shares land border with India can invest in any sector only after getting government approval.

Top sectors which saw maximum FDI from China during April 2000-March 2020 are automobile ($987.35 million), metallurgical ($199.28 million), electrical equipment ($185.33 million), services ($170.18 million), and electronics ($151.56 million).

World Bank approves $750 million fund to support Covid-hit MSMEs

The Economic Times | 02 July 2020

The World Bank announced a $750 million MSME Emergency Response program to support increased flow of finance to micro, small, and medium enterprises (MSMEs), severely impacted by the COVID-19 crisis.

This programme will address the immediate liquidity and credit needs of some 1.5 million viable MSMEs to help them withstand the impact of the current shock and protect millions of jobs.

This is the first step among a broader set of reforms that are needed to propel the MSME sector over time, it said in a statement.

“The MSME sector is central to India’s growth and job creation and will be key to the pace of India’s economic recovery,

Coronavirus may cost India USD 150 billion this year; economic activity in these cities takes hardest hit

Bloomberg | 02 July 2020

Along with the lives, the coronavirus pandemic may cost India $150 billion in the current year 2020. The nationwide lockdown and standstill businesses in the April-June quarter caused the economy to shrink by 17 per cent till May, said a research report by the World Bank. It added that the GVA in the calendar year 2020 is likely to contract by 5.1 percent, going by the trend so far. However, it further said that the actual growth will depend on whether the economy will continue to be held back by the Covid-19 pandemic; whether it will revert to previous levels; or whether it will overshoot to compensate for forgone activity during the lockdown.

In the research carried out on the basis of daily electricity consumption and nighttime light intensity, the World Bank said that both electricity consumption and nighttime light intensity can provide a measure of economic activity in India. The findings suggested that the economic impact of the lockdown was not equal across states, districts, and cities, and the impact of the lockdown varied across them. The heterogeneity was related to the economic structure of the states and the migration patterns.

However, it was also found out that a larger number of Covid-19 infections resulted in a larger decline in nighttime light intensity in cities, but not in states. While nearly all the cities reported a fall in light intensity in April 2020, the contraction ranged from 16.8 per cent in Nagpur to 0.5 per cent in Pune. In Delhi, the nighttime light intensity shrank by 13 per cent. However, in Kolkata and Patna, the light intensity did not decline at all. The World Bank has revealed a positive correlation between Covid-19 cases per million residents and the decline in light intensity. Having more than 50 cases per million residents is associated with a 15 percentage points larger decline in light intensity.

Neyveli boiler blast: Explosion at NLC power plant kills six workers, injures 17

The Times of India | 02 July 2020

Six workers died and 17 others were injured in a blast at thermal power station (TPS) II of the Neyveli Lignite Corporation around 9.45am in Neyveli on Wednesday. According to NCIL sources, the cause of the explosion was being ascertained.
The accident comes just a month after five workers died in an explosion at the plant on May 7.

The injured workers were given first aid at NLCIL hospital and 16 of them were later referred to a private hospital in Chennai for treatment.

Eleven of the 16 injured were said to be in critical condition. One worker, who sustained minor injuries, was undergoing treatment at the NLCIL GH.

The explosion triggered a blaze when a maintenance team attempted to light up unit 5 that was shut down on May 7 following an explosion in unit 6 in which five workers died and three others were injured. The company shut all the four 210MW-capacity units and ordered an immediate safety audit.

New projects fall over 50% in June as coronavirus lockdown takes hold

Business Standard | 01 July 2020

The lockdown which came into effect towards the end of March has caused new projects to plummet and existing projects to stop work, amid what is expected to be the worst year for the economy in decades. New projects in the June quarter were at Rs 0.56 trillion, down 51.7 per cent compared to the same period in 2019, showed data from the Centre for Monitoring Indian Economy (CMIE). Completed projects were down 83.9 per cent to Rs 0.14 trillion

Interestingly, the number of revived project showed an 82.8 per cent rise, while stalled projects also fell 23.1 per cent.

Growth measured in terms of gross domestic product (GDP) was already seen to be at an 11-year low, before much of the lockdown to contain the Covid-19 pandemic had taken effect.

The report noted that companies which are involved in creating infrastructure projects are facing issues of labour and liquidity as work dries up. It noted that large players like Larsen & Toubro, KEC International, Kalpataru Power Transmission are focusing on attracting and retaining contractual labour. They are also looking to increase their cash levels to tide over current challenges as payments from public sector companies and states have dried up.

June manufacturing activity shrinks for third month in a row; PMI at 47.2

Business Standard | 01 July 2020

India’s manufacturing activity again contracted in June as regional lockdown extensions severely held back demand and labour logistic challenges remained, said the monthly IHS Markit India Manufacturing Purchasing Managers’s Index (PMI) survey.

Manufacturing PMI stood at 47.2 in June after May’s 30.8 and April’s historic low of 27.4. In PMI parlance, a print above 50 means expansion, while a score below that denotes contraction.

He situation was made worse by plunging demand from international markets, which further deteriorated sales trends. Exports had contracted since April when outbound sales had dropped at the quickest pace in over 15 years. The Federation of Indian Exports Organizations expects exports in June to shrink by 12 per cent, down from May’s high 36 per cent. Case in point, India’s biggest overseas markets for merchandise shipments such as the United States, gulf nations and the European Union have been hit hard by the ongoing pandemic.

According to data from the Index of Industrial Production, a collapse in manufacturing sector had led to industrial output falling by 55.5 per cent in April. The PMI survey, however, showed that manufacturers remained optimistic towards the one-year business outlook in June, with sentiment strengthening to a four-month high.

US May caustic soda exports fall on month as prices rise

S&P Global Platts | 7th July 2020

Houston — US caustic soda exports fell 23% in May from April, as prices rose compared with other major producing regions, according to the latest US International Trade Commission data, released July 7.

The US exported 554,991 mt of caustic soda in April, down 2.6% from March as chlor-alkali rates fell to April’s 68% from March’s 90% on sharply lower demand for chlorine and downstream products made with it. Those products include construction staple polyvinyl chloride and hydrochloric acid, used in oil and gas production, as construction and oil and gas activity cratered amid widespread global shutdowns to stem the spread of the coronavirus pandemic.

Caustic soda, a key feedstock in alumina and pulp and paper industries, is a byproduct of chlorine production.

However, as economies began reopening in May, caustic soda exports slid further despite industry data that showed chlor-alkali rates rebounded to 75%.

Market sources said the decline likely stemmed from buyers turning to imports from Asia and Europe, where prices for export material were lower than US pricing.

US caustic soda prices began 2020 at $200/mt FOB USG, having been under
pressure throughout 2019 because of sluggish industrial demand. Chlor-alkali rates were strong, ranging from 86% to 90%, in January through March, on solid chlorine demand, maintaining healthy caustic soda output.

When chlor-alkali rates plunged in April, caustic soda supply sank, pushing prices up 77% to $400/mt FOB USG June 16 from $225/mt FOB April 7, S&P Global Platts data showed. US export prices remained at that level through June 30 as export activity thinned.

Prices in Europe and Asia also rose in April as chlor-alkali rates retreated, but began falling as US prices held. The FOB Northeast Asia marker was assessed June 7 at $235/dmt, down nearly 13% from $270/dmt May 12, while the CFR Southeast Asia marker was assessed June 7 at Europe’s FOB NWE marker was last assessed June 30 at $250/mt, a 28.5% drop from $350/dmt May 12, Platts data showed.

A US market source said traders have sought lower-priced European and Asian cargoes for buyers in Central and South America, which traditionally are solid US export markets given the proximity.

US ITC data showed that, in the first five months of 2020, the US exported 2.35 million mt of caustic soda, down 3.6% from the same period in 2019.

**Chemicals firm SRF board approves setting up of Rs 315 crore chloromethane plant**

*The Economic Times | 28 July 2020*

Chemicals firm SRF Ltd said its board has given approval for setting up of an additional chloromethane facility at Dahej in Gujarat at a cost of Rs 315 crore.

In a regulatory filing, the company also said its consolidated net profit declined 6.41 per cent to Rs 177.09 crore in the first quarter of 2020-21 as compared with Rs 189.22 crore in the year-ago quarter.

SRF Managing Director Ashish Bharat Ram said, “Every business had to deal with unique challenges but found ways of delivering results. The packaging films business was quick to adapt to the environment and performed well. I remain cautiously optimistic of a healthy performance going forward.”

**Kutch Specialities selects KBR’s technology for nitrobenzene project**

*Chemical Weekly | 28 July 2020*

American EPC firm, KBR, has announced that it been awarded a contract for its proprietary Plinke adiabatic nitrobenzene solutions by Kutch Specialities Pvt. Ltd. Under the terms of the deal, KBR will provide basic and detailed engineering design, equipment, and related advisory services to Kutch Specialities for its grassroots nitrobenzene project. Amongst other products, nitrobenzene is used for the production of polyurethane foams, rubber chemicals, dyes and pharmaceuticals.

**G.G. Nayak, former Executive Secretary, ICMA, no more**

*Chemical Weekly | 07 July 2020*

Mr. G.G. Nayak, former Executive Secretary of the Indian Chemical Manufacturers Association (ICMA), now known as the Indian Chemical Council (ICC), passed away in Mumbai on June 4, 2020 after a brief illness. He was 87. He is survived by his sons, Sanjay and Sunil.

Mr. Nayak served ICMA for two decades from 1972, until his retirement in 1992. He served under several Presidents of the association, and played a key role in managing its affairs and liaising with government bodies and regulators. He provided the all-important secretarial support to the working of the association, especially the special committee set up by the association for the selection of the coveted ICMA awards handed out every year to recognise stellar achievements in technology development, environmental protection, energy conservation etc. Prior to his stint at ICMA, Mr. Nayak was associated with the Basic Chemicals, Cosmetics and Dyes Export Promotion Council (Chemexcil), part of the Ministry of Commerce, Government of India, during its formative years, from 1964 to 1972.

In his official capacity at the trade promotion council, he played an important role in bringing awareness of the Indian chemical industry to international buyers, including by personally conducting several overseas trips to promote the nascent Indian industry of those times.

**Gujarat Alkalies raises outlay for chloromethanes project in Dahej**

*Chemical Weekly | 07 July 2020*

Gujarat Alkalies and Chemicals Ltd. (GACL) has informed that its board has revised project cost estimates for its proposed 105,000-tpa chloromethanes facility at Dahej in Gujarat.

The revised outlay for the project was earlier estimated to be Rs. 683-crore. However, in a recent stock exchange filing, the company informed that it has now revised this to Rs. 800-crore.

The company has plans for chloromethanes at its Vadodara unit, having a capacity of 56,100-tpa. In the last five years, the production capacity of chloromethanes has seen growth of 6.26% from 37,888-tonnes in FY14 to 51,325-tonnes in FY19.

Along with the new chloromethanes plant, GACL had also planned setting up a 33,870-tpa phosphoric acid plant and a 10,000-tpa hydrazine hydrate plant at Dahej.
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Tel: 86 731 28891155 ext. 8121  Fax: 86 731 22565733
Mob.: 0086 13574290222 (Mr. Frank Ding), 0086 18773335922 (Mr. Zhang)
Email: frankding@kori.cn, zsy@kori.cn
Website: www.kori.cn

1. DGTR Trade Notice: 01/2020 Dated 10/04/2020 - Temporary changes in the Trade Remedy Investigation processes due to COVID-19 pandemic

2. DGTR Trade Notice: 03/2020 Dated 9/07/2020 Temporary changes in the Trade Remedy Investigation processes due to COVID-19 pandemic

3. Inviting Applications under the scheme for Setting up of Centers of Excellence in the field of Petrochemicals - File No.PC-II-25012/1/2020-PC II-CPC Dated 10/07/2020 issued by Ministry of Chemicals
   https://chemicals.nic.in/sites/default/files/lr%20to%20NIC%20for%20website%20extended%20date%20with%20guidelines.pdf


5. DGFT Trade Notice: 23/2020-2021 Dated 31/07/2020 - Issuance of Preferential Certificate of Origin for India’s exports to Thailand under ASEAN-India FTA
   https://content.dgft.gov.in/Website/dgftprod/1bd2f586-1519-4fbc-a9d2-6be3e1090468/Trade%20Notice%202023%20e-COO%20Thailand.pdf
OFFICE MEMORANDUM

Subject: Timeline/guideline for submitting Form 1 and Form 3 for FY 2019-20


And whereas sub-rule (1) of rule 6 of the Energy Conservation (the Form and Manner for Submission of Report on the Status of Energy Consumption by the Designated Consumers) Rules, 2007, referred to in para 1 above, provide that Every designated consumer shall-

1. submit in electronic form to the designated agency, within three months, the first report on the status of energy consumption at the end of the previous financial year in Form 1 of the Annexure; and
2. submit to the designated agency subsequent reports for each financial year in the same manner on the status of energy conservation in Form 1 of the Annexure within three months of the close of that financial year.

And whereas in exercise of the powers conferred by clause (h) of sub-section (2) of section 56 read with clause (k) of section 14 of the Energy Conservation Act, 2001 (52 of 2001), the Central Government, hereby makes the rules, the Energy Conservation (Form and Manner and Time for Furnishing Information with Regard to Energy Consumed and Action Taken on Recommendations of Accredited Energy Auditor) Rules, 2008.

And whereas sub rule (1) and (2) of rule 3 of the Energy Conservation Act, 2001 (52 of 2001), the Central Government, hereby makes the rules, the Energy Conservation (Form and Manner and Time for Furnishing Information with Regard to Energy Consumed and Action Taken on Recommendations of Accredited Energy Auditor) Rules, 2008, referred to in para 3 above, provide that Every designated consumer shall -

1. Every designated consumer within three months of the submission of energy audit report by the accredited energy auditor shall, furnish in electronic form as well as in a hard copy, to the designated agency, -
   a. details of information on energy consumed during the year preceding to the year for which energy audit was undertaken as verified by the accredited energy auditor, in Form 1;
   b. details of specific energy consumption product-wise for the period referred to in clause (a), in Form 1;
   c. details of the action taken on the recommendations made by the accredited energy auditor in the energy audit report submitted under the Act, in Form 2.
2. Every designated consumer shall furnish to the designated agency every year, the details of progress made in consequence of the action taken by it as per clause (c) of sub-rule (1) of rule 3 together with the details of energy efficiency improvement measures implemented and consequent savings achieved in Form 3, within three months of the close of that year.

And whereas the designated consumers are required to submit the Form 1 and Form 3 by end of 30th June, 2020 in compliance with the aforesaid, most of the designated consumers from almost all have informed that Due to the COVID-19 pandemic and subsequent travel & other restrictions, they are not in a position to submit same by the date of 30th June, 2020 on account of the reasons beyond their control which are summarized below:-

Due to the COVID-19 pandemic and subsequent travel & other restrictions, the DCs have informed that the verification of FORM 3 by AEA is not possible within the due date of June, 2020. About 40-50 representations jointly from almost all sectors i.e. Aluminium, Cement, Chlor Alkali, Fertilizer, Iron and Steel and TPP Sector have been received seeking extension of time beyond June, 2020 i.e. about 45 day so that they may able to do the compliance by submitting Form 1 and verified Form 3 by end of extended data.

Now, therefore, BEE has taken into consideration the above difficulties expressed by DCs and the Competent Authority has approved an extension of time of two months with effect from the 1st July, 2020 to 31st August, 2020 to enable the Designated Consumers to submit to the respective State Designated Agencies, with a copy to the Bureau, the Form 1 and Form 3 for the financial year 2019-20 on compliance to the above mentioned rules.

To,

1. All Designated Consumers,
2. State Designated Agencies - For further circulation to DCs under the State.
3. Sectoral Associations

(Ashok Kumar)
Director
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### Key Indicators June 2020

#### 1 Alkali Imports (MT)

<table>
<thead>
<tr>
<th></th>
<th>Qty (Jun 2020)</th>
<th>Qty (Jun 2019)</th>
<th>% Difference (Y-o-Y)</th>
<th>Qty (May 2020)</th>
<th>% Difference (M-o-M)</th>
<th>FY 2020-21 (upto Jun)</th>
<th>FY 2019-20 (upto Jun)</th>
<th>% Difference</th>
<th>Total Imports 2019-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caustic Soda</td>
<td>24,076</td>
<td>15,528</td>
<td>55.1%</td>
<td>15,204</td>
<td>58.4%</td>
<td>89,193</td>
<td>89,207</td>
<td>0.0%</td>
<td>374,976</td>
</tr>
<tr>
<td>Soda Ash</td>
<td>29,416</td>
<td>70,115</td>
<td>-58.0%</td>
<td>31,967</td>
<td>-8.0%</td>
<td>113,688</td>
<td>257,641</td>
<td>-55.9%</td>
<td>946,031</td>
</tr>
</tbody>
</table>

Average Price in Jun 2020: Caustic Soda - 252 USD/MT (Lye) & 378 USD/MT (Flakes); Soda Ash - 224 USD/MT

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Imports</td>
<td>21.1</td>
<td>40.3</td>
<td>-47.6%</td>
<td>60.4</td>
<td>127.0</td>
<td>-52.4%</td>
<td>467.2</td>
</tr>
<tr>
<td>Exports</td>
<td>21.9</td>
<td>25.0</td>
<td>-12.4%</td>
<td>51.3</td>
<td>81.1</td>
<td>-36.7%</td>
<td>314.3</td>
</tr>
<tr>
<td>Surplus/Deficit</td>
<td>0.8</td>
<td>-15.3</td>
<td></td>
<td>-9.1</td>
<td>-46.0</td>
<td></td>
<td>-152.9</td>
</tr>
</tbody>
</table>

#### 3 Exchange Rate (Rs./USD)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>May 2020</th>
<th>Apr 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75.73</td>
<td>75.66</td>
<td>76.24</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>85.4</td>
<td>106.5</td>
<td>-19.8%</td>
</tr>
<tr>
<td>Manuf</td>
<td>106.9</td>
<td>129.0</td>
<td>-17.1%</td>
</tr>
<tr>
<td>Elec</td>
<td>156.2</td>
<td>173.6</td>
<td>-10.0%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>112.9</td>
<td>132.8</td>
<td>-15.0%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical &amp; Chemical Products</td>
<td>113.8</td>
<td>116.0</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Textiles</td>
<td>50.3</td>
<td>110.1</td>
<td>-54.3%</td>
</tr>
<tr>
<td>Paper &amp; Paper Products</td>
<td>54.2</td>
<td>89.7</td>
<td>-39.6%</td>
</tr>
<tr>
<td>Basic Metals</td>
<td>123.9</td>
<td>164.1</td>
<td>-24.5%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>NA</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>Russia</td>
<td>112.7</td>
<td>125.4</td>
<td>-10.1%</td>
</tr>
<tr>
<td>Brazil</td>
<td>83.6</td>
<td>95.1</td>
<td>-12.1%</td>
</tr>
<tr>
<td>European Union</td>
<td>93.4</td>
<td>105.3</td>
<td>-11.3%</td>
</tr>
<tr>
<td>USA</td>
<td>93.4</td>
<td>105.0</td>
<td>-11.0%</td>
</tr>
</tbody>
</table>

#### 9 All India Inflation Rates (Base: 2012=100)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>151.6</td>
<td>142.9</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

#### 10 Consumer Price Inflation - Industrial Workers (Base: 2001=100)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>Jun 2019</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>332</td>
<td>316</td>
<td>5.1%</td>
</tr>
</tbody>
</table>

#### 11 Foreign Investment Inflows (US$ Million)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>May 2020</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Foreign Direct Investment</td>
<td>NA</td>
<td>2,016</td>
<td>-</td>
</tr>
<tr>
<td>Net Portfolio Investment</td>
<td>NA</td>
<td>-659</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>1,357</td>
<td>-</td>
</tr>
</tbody>
</table>

#### 12 Foreign Investment Promotion Board (FIPB) Approvals (US$ Million)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>May 2020</th>
<th>Apr 2020</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>13</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 13 Foreign Exchange Reserves (US$ billion)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020 (as on 26 Jun 2020)</th>
<th>May 2020 (as on 29 May 2020)</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>507</td>
<td>493</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

#### 14 Fiscal Deficit (Apr 2020-Jun 2020)

<table>
<thead>
<tr>
<th></th>
<th>% of Actuals to Budget Estimates FY 2020-21</th>
<th>% of Actuals to Budget Estimates FY 2019-20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83.2%</td>
<td>61.4%</td>
</tr>
</tbody>
</table>

#### 15 Purchasing Managers Index (PMI)

<table>
<thead>
<tr>
<th></th>
<th>Jun 2020</th>
<th>May 2020</th>
<th>Apr 2020</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47.2</td>
<td>30.8</td>
<td>27.4</td>
<td></td>
</tr>
</tbody>
</table>

Index over 50 shows expansion, while below 50 means contraction.
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Anisole EPC Project

EGYPT
Sulfuric Acid EPC Project

PARAGUAY
Chlor Alkali EPC Project

INDIA
Hydrogen Peroxide EPC Project

ABU DHABI
Calcium Chloride EPC Project

TURKEY
Sulfuric Acid EPC Project

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