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Dear Reader,

The anti-dumping investigations concerning imports of soda ash from Turkey, USA, Iran and Russia saw no progress due to changes in the Designated Authority (Director General) in the Directorate General of Trade Remedies (DGTR). As low-priced imports continued to impact domestic industry, a request was submitted to the Department of Chemicals and Petrochemicals (DCPC) for extension of minimum import price (MIP) on imports of soda ash for a further period of six months beyond 30th June 2025. DCPC took a favourable view of the representation by AMAI and in a series of fast-paced activities, recommended to DGTR for extension of MIP till December 2025. DGTR issued the notification on 30th June 2025, extending the validity of MIP on soda ash imports by six months i.e. up to 31st December 2025. With this crucial support, the next challenge for the industry was to ensure implementation at the ports of entry. The Association represented to the government at various levels and also met officials to press for enforcement of the MIP notification as data shows almost 40% imports during Jan-Jun 2025 that came below MIP. Evidently, importers had found a way to circumvent the MIP provision to bring in material at very low prices. The government authorities assured to investigate the matter and ensure strict enforcement.

Two trade agreements continued to attract attention during the month. The India-ASEAN FTA (AITIGA) is among the most skewed FTA that has resulted in widening of the trade imbalance in favour of ASEAN countries. The Asean-India Trade in Goods Agreement (AITIGA) became operational in 2010, during the UPA-II government. Since then, India's trade deficit with ASEAN widened from $4.98 billion in 2010-11, the first full year of operation of AITIGA to $44.20 billion in 2024-25. India's exports to the region fell by 5.77% in 2024-25 to $38.96 billion while imports grew by 5.65% to $84.16 billion. In fact, in a candid comment, the Commerce & Industry Minister, Shri Piyush Goyal denounced AITIGA and called ASEAN as a conduit for Chinese goods. AITIGA review discussions made slow progress with India taking a cautious approach and blaming ASEAN for going slow on negotiations. Negotiations are expected to conclude by end-Dec 2025. AITIGA also remains the most underutilized FTA as per the government.

The second FTA negotiations is between India and USA that has been a roller-coaster ride so far. Multiple rounds of negotiations have not yielded results. Among the key contentious issues hindering progress are market access to agricultural products, particularly dairy and farm goods where India is seeking to protect domestic interests. Among other areas of disagreement are steel and auto components where our industries need to be protected. The Indian government is hopeful of some progress before the July 9 deadline for US President Donald Trump's proposed 26 per cent reciprocal tariff to take effect.

Three other trade agreements negotiations that made significant progress and raised hopes of early conclusion of a deal were the India-Peru FTA, India-Chile FTA and India-EU FTA. The core issues under discussion in the India-Peru FTA and India-Chile FTA (CEPA) are access and assured supply of critical minerals such as copper, zinc, lithium, molybdenum, and rare earth elements, essential for its green energy transition and manufacture of electrical vehicles. Non-tariff barriers remain a key issue to be resolved in the India-EU FTA. Efforts are on for concluding the deal by end-2025.

India's exports may see higher growth after the ongoing FTAs become operational. The overall merchandise and services exports in FY 2024-25 are estimated at US$ 820.93 billion, witnessing a 5.5% growth. The government's target of US$ 2 trillion in exports by 2030 may well be within reach when the trade agreements become operational.

K. Srinivasan
Secretary General

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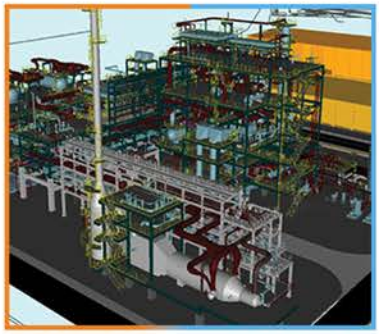
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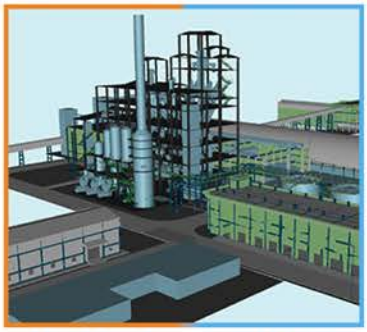


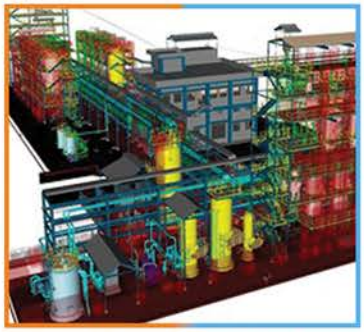
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World Environment Day 2025 (WED -25)

Hari Saran Das, Honorary SHE Advisor, AMAI

Environment and human life

Environment can be defined as a sum total of all the living and non-living elements and their affects that influence human life. While all living or biotic elements are animals, plants, forests, fisheries, and birds, non-living or abiotic elements include water, land, sunlight, rocks, and air. Environment supports natural process (Soil regeneration, flood prevention, waste decomposition, crop pollination and dispersal). We depend on Environment for our survival. Therefore Protection of Environment is important for our existence.

World Environment Day (WED)

Led by the United Nations Environment Programme (UNEP), World Environment Day is celebrated annually on 5 June to encourage awareness and action for the protection of the environment. WED is the largest global platform for environmental public outreach.

World Environment Day is celebrated by millions of people across the world. It is supported by many non-governmental organizations, businesses, government entities, and represents United Nations outreach day supporting the environment.

The World Environment Day was established in 1972 by the United Nations General Assembly. The UN General Assembly designated June 5 as the World Environment Day, coinciding with the start of the Stockholm Conference on the Human Environment. The first WED celebration took place in 1974, with the theme "Only One Earth," and was hosted in Spokane, USA.

World Environment Day (WED) has been a platform for raising awareness on environmental issues such as marine pollution, overpopulation, global warming, sustainable development and wildlife crime etc. One hundred fourty three (143) Countries of the world participate in the event. Countries such as, Argentina, Australia, Austria, Brazil, Canada, Chile, Denmark, Finland, France, Germany, India, Israel, Italy, Japan, Mexico, the Netherlands, Norway, the Philippines, Poland, South Africa, Spain, Switzerland, Thailand, the Unites States of America and many other countries participate in celebrating world Environment Day. Every year, the program has provided a theme and forum for businesses, non-government organizations, communities, politicians and stars to advocate environmental causes.

Theme of the World Environment Day 2025

World Environment Day in 2025 will focus on ending plastic pollution. For decades, plastic pollution has seeped into every corner of the world, leaching into the water we drink, into the food we eat, and our bodies. While plastic pollution is a major concern, it is also one of the most fixable of today's environmental challenges, with some obvious solutions at hand. World Environment Day will spotlight the growing scientific evidence on the impacts of plastic pollution and drive momentum to refuse, reduce, reuse, recycle, and rethink plastics use. It will also reinforce the global commitment made in 2022 to end plastic pollution through a global plastic pollution treaty.

The Republic of Korea will be the host country for the global celebrations. The campaign will use inspiration from nature and showcase real-world solutions to encourage collective action

Intensity of Plastic Pollution

Plastic pollution exacerbates the deadly impacts of the triple planetary crisis. The "triple planetary crisis" refers to three interconnected environmental challenges: climate change, nature and biodiversity loss, pollution and waste. These issues are linked, with actions affecting one often impacting the others.

Globally, an estimated 11 million tonnes of plastic waste leak into aquatic ecosystems each year, while micro plastics accumulate in the soil from sewage and landfills, due to the use of plastics in agricultural products. The annual social and environmental cost of plastic pollution ranges between US$300 billion and US$600 billion. .

WED25 and The #Beat Plastic Pollution

World Environment Day 2025 joins the UNEP-led # Beat Plastic Pollution to mobilize communities worldwide to implement and advocate for plastic pollution solutions. The #Beat Plastic Pollution campaign is a global initiative led by the UN Environment Programme (UNEP) to raise awareness

and inspire action against plastic pollution. The campaign's goal is to mobilize communities worldwide to implement and advocate for plastic pollution solutions.

About the host Country, Republic of Korea

The Republic of Korea will host the global celebrations; WED-25.It is set to host the global observations for World Environment Day for the second time. It first hosted the World Environment Day in 1997.The theme for World Environment Day in 1997 was "For Life on Earth". This theme was chosen to emphasize the interconnectedness of all life and the importance of protecting the environment for current and future generations.

Over the past 28 years, the country has made remarkable progress in improving water and air quality, managing chemicals safely, and protecting and restoring ecosystems. Building on decades of experience of engaging businesses through extended producer responsibility, to-day, the Republic of Korea is among the countries leading efforts to tackle plastic waste. The country's full life-cycle plastic strategy aims to address every stage in the life cycle of plastics, from production and design to consumption, reuse and recycling. The strategy brings together the government, businesses and consumers to reshape how plastics are used and disposed of. By curbing waste at its source, expanding recycling efforts, and accelerating the transition to a circular economy, the Republic of Korea is taking decisive action to reduce plastic pollution and build a more sustainable future.

Jeju Province in the Republic of Korea has been chosen as the host location for World Environment Day 2025. In 2022, the province declared a vision to become free of plastic pollution by 2040. Jeju is the only province in the country where household waste must be disposed of at designated recycling support centres. The system requires waste separation from the source, driving higher recycling rates and ensuring more waste is repurposed. Also, Jeju is the first province to introduce a disposable cup deposit system in the Republic of Korea.The Republic of Korea, particularly Jeju province, is implementing a disposable cup deposit system to reduce plastic waste. Customers pay a deposit (e.g., 300 won) for disposable cups at coffee shops and other businesses, and the deposit is refunded when the cup is returned. This system aims to increase the return and reuse rate of disposable cups.

Global treaty to end plastic pollution

This year's World Environment Day observance comes as countries make progress towards securing a global treaty to end plastic pollution, including in the marine environment. In November 2024, the Republic of Korea hosted the fifth session of negotiations to develop a plastic pollution treaty. The second part of the session will take place from 5 to 14 August in Geneva, Switzerland.

World environment day 2025 pledge

World Environment Day 2025 calls for collective action to tackle plastic pollution. By drawing inspiration from nature and showcasing real-world solutions, the campaign encourages individuals, organizations, industries, and governments to adopt sustainable practices that drive systemic change.

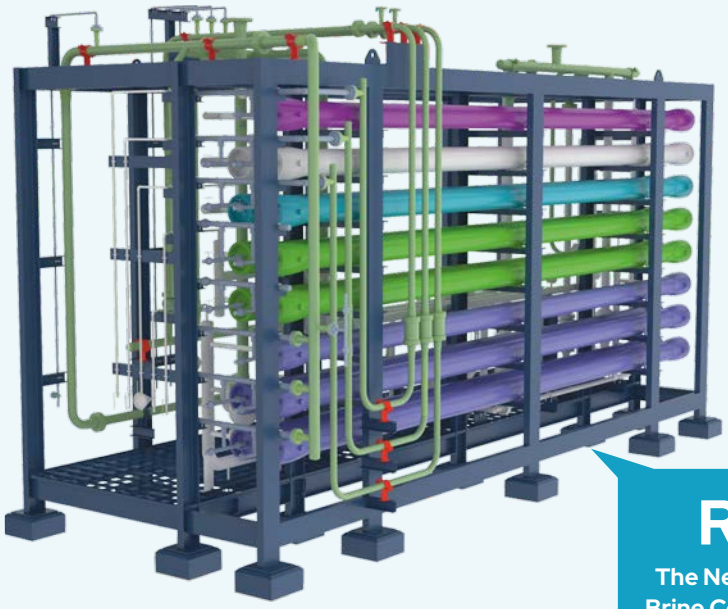
World Environment Day pledge by Individuals

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PVC Industry: Import Dependency set to Halve below 30% by FY27

CareEdge Ratings

SYNOPSIS

Demand for polyvinyl chloride (PVC) resin in India has wit- nessed healthy growth at a CAGR of 6.2% during FY20-FY25, reaching 4.7-mt during FY25, on the back of strong demand from end-user industries supported by favourable government policies. PVC demand is expected to grow by ~8% per annum to reach ~5.5-mt by FY27. Out of India's total demand for PVC, ~95% pertains to Suspension PVC resin, and the balance ~5% pertains to Paste PVC resin.

Due to stagnant domestic manufac- turing capacity at ~1.8-mtpa over the past few years, the demand-supply gap has widened from ~1.5-mt in FY22 to~3-mt in FY25, which has been catered through a steady increase in imports, which constituted ~62% of total domes- tic PVC consumption in FY25. These imports have primarily come from China, Japan, Taiwan, South Korea and the USA. New PVC resin manufactur- ing capacity of ~2.5-mtpa is expected to gradually come on stream in India by FY27, which is envisaged to reduce our import dependency from ~3-mt in FY25 to an average of ~1.4-mt in FY27. Sur- plus capacity and weak demand in major global economies resulted in substantial dumping of cheaper PVC in India during the last few years, which put pressure on domestic PVC prices and led to modera- tion of the PVC-EDC (Ethylene Dichlo- ride) spread, impacting the profitability of India's PVC players.

Going forward, PVC-EDC spread is expected to remain under pressure at below $400 per tonne in H1FY26 amidst continued demand slowdown in major economies and ongoing trade war. However, with BIS Quality Stan- dards for import of PVC resin slated to become effective from end-June 2025 and likely imposition of anti-dumping duty on Suspension PVC resin imports, subject to final findings of the DGTR, the PVC-EDC spread is expected to improve to ~$500 per tonne in H2FY26, thereby helping Indian PVC players.

Strong domestic PVC demand; consump- tion Projected at ~5.5-mt by FY27

PVC resin (suspension & paste) pri- marily finds application in end-use sec- tors such as irrigation systems (pipes), real estate (plumbing and building mate- rials), infrastructure (water supply and sanitation) and automotive. PVC resin is mainly used in the manufacturing of products such as pipes & fittings (~80% demand) and wires & cables (~7%) amongst others, which are mainly used in the above-mentioned end-use sectors.

Demand for PVC resin has wit- nessed healthy growth at a CAGR of 6.2% during FY20-FY25. PVC resin demand increased to 4.7-mt during FY25, with ~11% y-o-y growth, on the back of strong demand from end-user sectors supported by favourable govern- ment policies such as Pradhan Mantri Awas Yojana, Jal Jeevan Mission, etc. Going forward as well, CareEdge Ratings expects PVC demand momen- tum to continue with expected growth of ~8% per annum to reach 5.5-mt by FY27 on the back of strong demand from end-user sectors, considering the existing low per capita consumption of PVC. On the back of strong demand growth coupled with stagnant domestic manufacturing capacity at ~1.8-mtpa over past few years, the demand-supply gap for PVC resin widened from ~1.5-mt in FY22 to ~3-mt in FY25 which has been catered through steady increase in imports primarily from China, Japan, Taiwan, South Korea and the USA.

Significant domestic capacity planned to cut import dependency

Considering the robust and sustain- able demand for PVC resin witnessed in the last few years, large-scale manu- facturing capacities are in the offing. In all, incremental PVC resin manufactur- ing capacity of ~2.5-mtpa is expected to come on stream by FY27. With that, Care Edge Ratings expects India's import dependency for PVC resin to decline from ~3-mt in FY25 to ~1.4-mt in FY27. However, sizeable import dependency is expected to continue in the foreseeable future due to the non-availability of an adequate and reliable supply of the key raw material, i.e., EDC, which could restrict further large capacity additions.

PVC-EDC spread expected to improve from H2FY26

In the immediate aftermath of the COVID-19 pandemic, domestic PVC prices and PVC-EDC spread improved in FY21 and FY22 due to supply-side challenges. Thereafter, PVC prices corrected signi- ficantly downward in FY23 with supply returning to normalcy, which was simul- taneously accompanied by a slowdown in global demand. During FY24-FY25, amidst challenging global macroeco- nomic conditions, international demand for PVC remained subdued, leading to an oversupply in the global market. This surplus was redirected to countries like India, where demand for PVC was strong.

Due to excess capacity and weak

demand in China, India has witnessed sizeable dumping of PVC from China during the last few years. Imports from China, which accounted for only ~3% of total PVC imports in India during FY20, rapidly increased to ~40% in FY25. Also, weak demand in the USA led to diversion of surplus production to the Indian market. This put sustained pressure on PVC prices, which declined by 24% from $1,026 per tonne in FY23 to $782 per tonne in FY25, resulting in a similar moderation in PVC-EDC spread, impact- ing the profitability of PVC players.

Tariff and non-tariff measures

During February 2024, the Depart- ment of Chemicals and Petrochemicals issued a Quality Control Order making a Bureau of Indian Standards (BIS) certifi- cate mandatory for PVC imports, which is expected to become effective from June 24, 2025, after a few postponements. Also, in October 2024, the Directorate General of Trade Remedies (DGTR), in its prelimi- nary findings, recommended imposition of an Anti-Dumping Duty (ADD) of up to $339 per tonne on imports of Suspen- sion PVC resin from seven countries, viz. China, Indonesia, Japan, South Korea, Taiwan, Thailand and the USA, to safeguard domestic manufacturers. ADD could be implemented after the DGTR submits the final findings and gets approval from the Ministry of Finance.

Furthermore, in March 2025, the Ministry of Finance notified ADD of up to $707 per tonne on imports of Paste PVC resin from China, South Korea, Malaysia, Norway, Taiwan, and Thailand. CareEdge Ratings expects the PVC-EDC spread to remain under pressure at below $400 per tonne in H1FY26, amidst a slowdown in major global economies and the ongoing trade war, despite strong domestic demand. However, with BIS quality standards becoming effective shortly and the likelihood of imposition of ADD on imports of Suspension

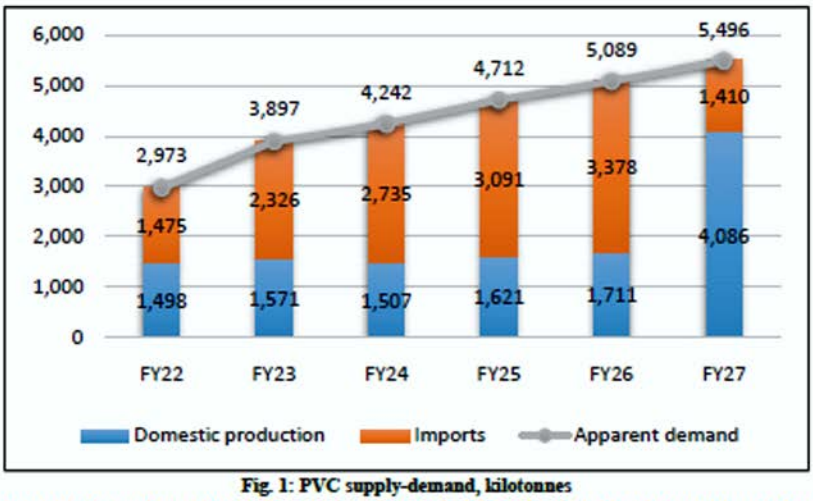


Fig. 1: PVC supply-demand, kilotonnes

Source: Company Annual Reports/Presentations, Chemicals & Petrochemicals Manufacturers' Association

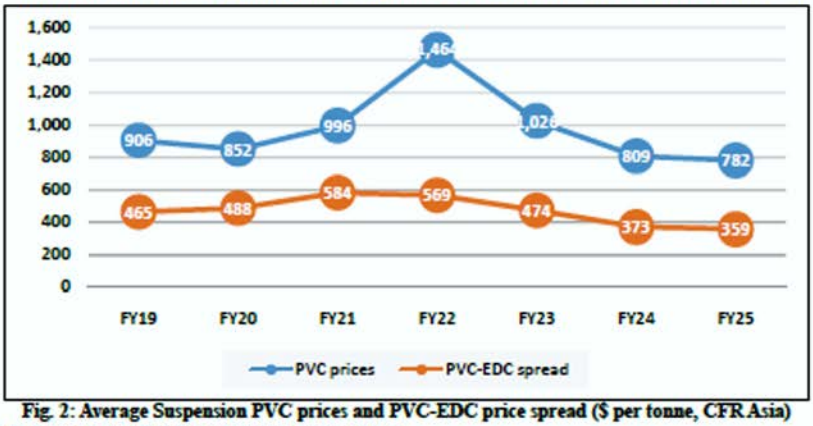


Fig. 2: Average Suspension PVC prices and PVC-EDC price spread ($ per tonne, CFR Asia)

Source: CMIE, Company Investor Presentations

Table 1: Details of ADD on imports of PVC resin from major exporting countries:

Anti-Dumping Duty ($ per tonne)	Japan	China	Taiwan	South Korea	USA
Active ADD on Paste PVC resin	#	up to 707	up to 373	up to 89	–
Proposed ADD on Suspension PVC resin	up to 147	up to 167	up to 163	up to 161	up to 339

#Currently, DGTR is undertaking an anti-dumping investigation concerning imports of Paste PVC resin originating or exported from European Union and Japan.

Source: www.dgtr.gov.in

PVC resin, PVC-EDC spread is likely to improve to ~$500 per tonne in H2FY26, thereby helping domestic PVC manufacturers.

CareEdge Ratings' View

"CareEdge Ratings anticipates a pivotal shift in India's PVC resin market,marked by robust expected annual demand growth of ~8%, reaching 5.5-mt by FY27. The upcoming addition of ~2.5-mtpa domestic capacity by FY27 is expected to more than double the current production levels, reducing import reliance to an average of ~ 1.4-mt, i.e., reduction in imports from ~ 62% (of overall domestic consumption) in FY25 to ~30% in FY27.

Furthermore, the anticipated enforcement of BIS quality standards and expected imposition of Anti-Dumping Duty on Suspension PVC resin is likely to curb low-priced imports, support domestic price recovery, and thus improve PVC-EDC spread to around USD $500 per tonne in H2FY26," said Rohan Deshmukh, Assistant Director, CareEdge Ratings.

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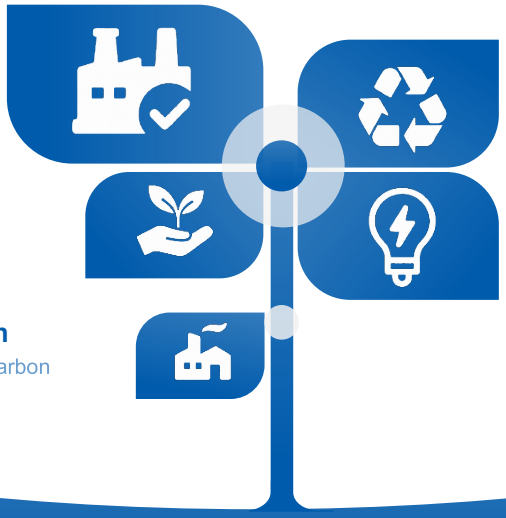
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Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Hazard Classification (Part II)

Hari Saran Das, Honorary SHE Advisor, AMAI

The Globally Harmonized System of classification and Labelling of Chemicals were set up to replace the assortment of hazardous material classification and labeling schemes previously used around the world. The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is an internationally agreed-upon standard managed by the United Nations.GHS Implementation is managed through UN Secretariat.

GHS has been enacted to significant extents in most major countries of the world. The European Union has implemented the GHS into EU law as Classification, Labelling and Packaging (CLP) Regulation. Whereas. United States implemented GHS as occupational Safety and Health Administration Standards.

GHS Core elements include standardized hazard testing criteria, universal warning pictograms, and harmonized safety data sheets which provide users of dangerous goods with a host of information. The system acts as a complement to the UN Numbered system of regulated hazardous material transport. A UN number is a four digit number used to identify dangerous goods for transport. UN numbers are set out in the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations (UNRTDG).

GHS Hazard classification

The GHS classification system defines and classifies the physical, health, and/or environmental hazards of a substance. Each category within the classifications has associated pictograms to be used when applied to a material or mixture. The GHS classification system is a complex system with data obtained from tests, literature, and practical experience.

Physical hazard

Substances or articles are assigned to 8 different hazard classes largely based on the United Nations Dangerous Goods System.

- **Explosives,** which are assigned to one of six subcategories depending on the type of hazard they present, as used in the UN Dangerous Goods System.
- **Gases are- category 1 flammable** if they start to flame in a range in air at 20 °C (68 °F) and a standard pressure of 101.3 kPa., **Category 2** is **Non-flammable** and nontoxic and **Category 3** is **toxic gases**. Substances and mixtures of this hazard class are assigned to one of two hazard categories on the basis of the outcome of the test or calculation method.
- **A flammable liquid** is a liquid with a flashpoint not more than 93 °C (199.4 °F). Substances and mixtures of this hazard class are assigned to one of four hazard categories on the basis of the flash point and boiling point. A pyrophoric liquid is a liquid that, even in small quantities, is liable to ignite within five minutes after coming into contact with air.
  Substances and mixtures of this hazard class are assigned to a single hazard category on the basis of the outcome of the UN Test N.3.
- **A flammable solid** is one that is readily combustible or may cause or contribute to fire through friction. Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source. it is further divided into
  - flammable solids,
  - polymerizing substances
- **Self-reactive substances**, are thermally unstable solids liable to undergo a strongly exothermic thermal decomposition even without participation of oxygen (air), other than materials classified as explosives, organic peroxides or as oxidising.
- **Pyrophoric substance** more colloquially described as spontaneously combusting substances are those solids or liquids that even in small quantities are liable to ignite within five minutes after coming into contact with air. Substances and mixtures of this hazard class are assigned to a single hazard category on the basis of the outcome of the UN Test N.2.
- **Self-heating substances**, A self-heating solids or liquids, other than a pyrophoric substance, is one which, by reaction with air and without energy supply, are liable to self-heat. Substances and mixtures of this hazard class are assigned to one of two hazard categories on the basis of the outcome of the UN Test N.4.
  Substances which on contact with

water emit flammable gases are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. Substances and mixtures of this hazard class are assigned to one of three hazard categories on the basis of the outcome of UN Test N.5, which measures gas evolution and speed of evolution.

- **Oxidizing substances** and organic peroxides contain
  • category 1: oxidizing substances and
  • category 2: organic peroxides, organic liquids or solids that contain the bivalent -O-O- structure and may be considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Substances and mixtures of this hazard class are assigned to one of seven 'Types', A to G, on the basis of the outcome of the UN Test Series A to H.
- **Radioactivesubstances**
- **Substances corrosive** to metal are substances or mixtures that by chemical action will materially damage or even destroy metals. These substances or mixtures are classified in a single hazard category on the basis of tests (Steel: ISO 9328 (II): 1991 - Steel type P235;Aluminium, ASTM G31-72 (1990) - non-clad types 7075-T6 or AZ5GU-T66). The GHS criteria are a corrosion rate on steel or aluminium surface corrosionexceeding 6.25 mm (0.246063in) per year at a test temperature of 55 °C (131°F).
- Miscellaneous dangerous substances

Health hazards

- **Acute toxicity.-** Acute toxicity includes five GHS categories from which the appropriate elements relevant to transport, consumer, worker and environment protection can be selected. Substances are assigned to one of the five toxicity categories on the basis of LD50 (oral, dermal) or LC50 (inhalation).
- **Skin corrosion-** Skin corrosion means the production of irreversible damage to the skin following the application of a test substance for up to 4 hours. Substances and mixtures in this hazard class are assigned to a single harmonized corrosion category.
- **Skin irritation-** Skin irritation - means the production of reversible damage to the skin following the application of a test substance for up to 4 hours. Substances and mixtures in this hazard class are assigned to a single irritant category. For those authorities, such as pesticides regulators, wanting more than one designation for skin irritation, an additional mild irritant category is provided.
- **Serious eye damage-** Serious eye damage means the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the front surface of the eye, which is not fully reversible within 21 days of application. Substances and mixtures in this hazard class are assigned to a single harmonized category.
- **Eye irritation-** Eye irritation means changes in the eye following the application of a test substance to the front surface of the eye, which are fully reversible within 21 days of application. Substances and mixtures in this hazard class are assigned to a single harmonized hazard category. For authorities, such as pesticide regulators, wanting more than one designation for eye irritation, one of two subcategories can be selected, depending on whether the effects are reversible in 21 or 7 days.
- **Respiratory sensitizer** -Respiratory sensitizer means a substance that induces hypersensitivity of the airways following inhalation of the substance. Substances and mixtures in this hazard class are assigned to one hazard category.
- **Skin sensitizer -**Skin sensitizer means a substance that will induce an allergic response following skin contact. The definition for "skin sensitizer" is equivalent to"contact sensitizer". Substances and mixtures in this hazard class are assigned to one hazard category.
- **Germ cell mutagenicity-** Germ cell mutagenicity means an agent giving rise to an increased occurrence of mutations in populations of cells and/or organisms. Substances and mixtures in this hazard class are assigned to one of two hazard categories. Category 1 has two subcategories.
- **Carcinogenicity-** Carcinogenicity means a chemical substance or a mixture of chemical substances that induce cancer or increase its incidence. Substances and mixtures in this hazard class are assigned to one of two hazard categories. Category 1 has two subcategories.
- **Reproductive toxicity -** Reproductive toxicity includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in offspring. Substances and mixtures with reproductive and/or developmental effects are assigned to one of two hazard categories, 'known or presumed' and 'suspected'. Category 1 has two subcategories for reproductive and developmental effects. Materials which cause concern for the health of breastfed children have a separate category: effects on or via Lactation.
- **Specific target organ toxicity (STOT)** - Specific target organ toxicity (STOT) category distinguishes between single and repeated exposure for Target

Organ Effects. All significant health effects, not otherwise specifically included in the GHS, that can impair function, both reversible and irreversible, immediate and/or delayed are included in the non-lethal target organ/systemic toxicity class (TOST). Narcotic effects and respiratory tract irritation are considered to be target organ systemic effects following a single exposure. Substances and mixtures of the single exposure target organ toxicity hazard class are assigned to one of three hazard categories. Substances and mixtures of the repeated exposure target organ toxicity hazard class are assigned to one of two hazard categories.

- **Aspiration hazard-** Aspiration hazard includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration . Aspiration is the entry of a liquid or solid directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system. Substances and mixtures of this hazard class are assigned to one of two hazard categories this hazard class on the basis of viscosity.

Environmental hazards

- **Acute aquatic toxicity** -Acute toxicity means the intrinsic property of a material of causing injury to an aquatic organism in a short-term exposure. Substances and mixtures of this hazard class are assigned to one of three toxicity categories on the basis of acute toxicity data: LC50(fish) or EC50 (crustacean) or ErC50 (for algae or other aquatic plants). In some regulatory systems these acute toxicity categories may be subdivided or extended for certain sectors.
- **Chronic aquatic toxicity-** Chronic aquatic toxicity means the potential or actual properties of a material to cause adverse effects to aquatic organisms during exposures that are determined in relation to the lifecycle of the organism. Substances and mixtures in this hazard class are assigned to one of four toxicity categories on the basis of acute data and environmental fate data: LC50 (fish) or EC50 (crustacean) or ErC50 (for algae or other aquatic plants and degradation or bioaccumulation.

Advances in Protective Coating Technology

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

INTRODUCTION:

The direct global cost of corrosion is estimated to be US$ 2.5 trillion, which is equivalent to 3.4 % of the global Gross Domestic Product (GDP) and that in India is about 4.2 % of our GDP, according to National Association of Corrosion Engineers (NACE), study on 'International Measures of Prevention, Application, and Economics of Corrosion Technologies (IMPACT) conducted in 2013. However, these costs typically do not include indirect cost such as: loss in productivity due to outages, delays, failures, individual health and safety, and environmental consequences, etc. The money spent only for applying protective coatings is quite staggering. The global market size in 2015 for all coatings and paints was USD $141.58 billion.

As the process of corrosion begins due to the electrochemical reaction of a surface with corrosive environments, one of the most effective, common, and convenient strategies is to effectively isolate a substrate's surfaces from electrochemical (corrosive) attack by covering it with a protective barrier or coating. Different types of coatings are used to create and maintain this type of protective barrier on the surface, and a large number of coatings are continuously being developed and offered in the market.

Since application of protective coatings is extremely useful for protecting the integrity of the critical structures/equipment deployed in the economy, a proper selection and application of the coatings are very important. The original equipment manufacturers (OEMs) and paint suppliers generally suggest cheap and conventional coating systems which usually don't minimize the life cycle cost (LCC) of the critical structure/equipment. In addition, the recurring cost of routine/repeated/ maintenance painting incurred by the economy becomes very high and the environmental load also increases considerably.

Considering the above facts, the author has discussed the selection and application features of recent advances in protective coating technology. The two most important developments namely: application of polyurea and ceramic coatings has been discussed in details.

POLYUREA COATINGS:

Polyurea coatings have some unique advantages that set them apart from other types of coatings; they also have some limitations and special requirements in order to apply them properly. Competitive advantages of polyurea over other coatings include its hydrophobic quality, fast curing ability (even at low temperature and irrespective of humidity) and superior corrosion resistance. Polyurea is commonly used as a waterproofing sealant and corrosion-resistance coatings on metals and concrete surfaces. Its applications include building construction, rail and road transport, bridges, boats and ships, automobiles, oil and gas structures, and machinery. The reasons for its widespread use and some future demand scenarios are discussed in this article.

This article examines eight questions that must be answered when considering these coatings.

1. What is Polyurea?

The raw materials for manufacturing polyurea are either aliphatic or aromatic isocyanates. Polyurea products based on aromatic isocyanates generally dominate the market because of their inherent advantages and physical features such as superior corrosion resistance and abrasion resistance, which are needed for coating boat hulls and other marine applications, building floors, wall construction and machinery, etc. The primary drawback of using aromatic isocyanate as a raw material is that the color and shine is adversely affected by the sun's ultraviolet rays (UV). Aliphatic polyurea is used for applications where color stability is very important.

Polyurea is an elastomeric substance derived from step-growth polymerization (type of polymerization mechanism in which bi-functional or multi-functional monomers react to form first dimmers, then trimers, longer oligomers and eventually long chain polymers). This involves combining a synthetic resin and isocyanate reactive materials. Thus, the reaction of an isocyanate part with a resin blend component part through the step growth process of polymerization producing polyurea.

Various formulations of resins and isocyanates can provide the desired setting time, moisture resistance, pigmentation, flame retarding properties and other unique features.

Pure polyurea has better moisture resistance and temperature resistance, whereas, hybrid polyurea has superior adhesion on concrete and metal surfaces. Hybrid polyurea also has superior abrasion resistance and is preferred for specific applications such as building construction machinery. Hybrid polyurea has a cost advantage over pure polyurea, and is expected to gain a major share of the global market demand in future as large investment in construction and infrastructure is forth-coming.

A hybrid coating is polyurea blended in polyurethane in predetermined proportions. The hybrid coating provides certain desirable physical properties of the pure polyurea at a lower cost.

2. How do Aliphatic Polyurea Differ from Aromatic Polyurea?

Polyurea derived from aromatic di-isocyanate is distinguished by ultraviolet (UV) light sensitivity. Sunlight exposure or artificial UV light can cause deterioration of the aromatic polyurea's physical properties and colour changes such as darkening and chalking. Although aromatic polyurea is a low-cost alternative but it is not appropriate as a top coat; it can be more adequate for a base coat application only.

Polyurea derived from aliphatic di-isocyanate can resist colour change due to sunlight exposure and maintain their physical properties even under UV exposure conditions. They are preferred for outdoor applications because they can improve aesthetics with a glossy appearance and can be used at lower film thickness of around 30 mills. However, they are expensive when compared to aromatic polyurea, due to the complicated manufacturing processing involved.

3. What are the Unique Features of Polyurea?

There is no coating system available that can successfully replace polyurea in all respects, due to its unique physical properties and durability of polyurea. However, its surface preparation requirements are very stringent**.**

Polyurea protects wooden, concrete and steel surfaces and structures from abrasion and corrosion damage. It can help preserve a deteriorating concrete structure and help repair and keep canals intact. It resists scratches, chemicals, oils and salts in commercial and industrial floor applications. It can also preserve boats and other vessels by providing protection from cracking and deterioration.

Advantages of polyurea coatings include:

- Very fast setting (curing time typically 2 to 5 minutes) depending upon the formulation
- Excellent abrasion and scratch resistance
- Very stable resistance to weather and environmental conditions
- Very beneficial elongation characteristics
- Can be applied in variable temperature conditions, even in high humidity.
- Stable heat resistance up to 130°C (266°F) and short-term rating of 220°C (430°F).
- Coating thickness can be finely controlled.
- Very effective bonding on correctly prepared surfaces of wood, cement, concrete and metals.
- Excellent chemical resistance.
- Feasibility of low viscosity, thus enabling mixing and spraying at desired temperatures.
- Can be formulated for a very high tensile strength up to 4350 psi.

4. Polyurea Market Outlook?

The global market size in 2015 for all coatings and paints was USD $141.58 billion. Of that, polyurea coatings were greater than USD $500 million, with the construction sector making up 40% of the market share. The global polyurea coating consumption in 2014 was 114.3 kilotons. The global market size in 2017 for polyurea coatings rose to USD $684 million.

Polyurea's market size continues to grow rapidly, partly due to it being approved as an eco-friendly low volatile organic compound coating (low VOC). Substitution of cheaper epoxies and other coatings by eco-friendly polyurea coatings is expected to cause a spurt in demand for polyurea. The global market share is expected to reach USD $ 1.4 billion by 2025, at a CAGR of 10.8 between 2020 and 2025.

Hybrid polyurea products are expected to be a major contributor to the polyurea market size because they are less expensive and have good abrasion resistance and adhesion to concrete and metallic surfaces. However, hybrid polyurea products may be lacking in moisture resistance as well as high temperature resistance as compared to pure polyurea coatings.

Faster growth in developing countries with their increasing need to protect infrastructure investment, machinery parts, equipment and machine tools could contribute to growth in demand. Higher moisture resistance and the quick setting properties of polyurea could generate demand for its use in containment liners, roof top coatings, bridges, offshore structures and car parking lot applications.

By region, North America has had a dominant market share, whereas Asia-Pacific is expected to grow faster than other regions due to government-funded infrastructure projects in China and India as well as due to foreign investment in various sectors of the economy.

5. Comparison of Polyurea to Epoxy and polyurethane coatings?

The benefits and advantages provided by polyurea coatings over comparable coatings such as epoxy include a combination of features such as superior surface strength, hydrophobic (water repellent) qualities, high tensile load capacity and inertness with most chemicals. Besides the flexibility and feasibility of designing and tailoring the different product features, polyurea systems also enable the use of fibres for reinforcement.

Unfortunately, applying polyurea requires costly spray equipment and skilled labour. The initial cost is high, but considering polyurea's higher effectiveness and durability, these coatings can be considered cost effective.

Developments in spray technology have popularized polyurea, thus other coatings such as epoxy coatings are being easily replaced by polyurea spray coatings. The main advantages of a spray system are the speed of application, quickness of curing and accuracy of the resulting coating thickness**.**

6. What are the application areas of polyurea coatings?

There are numerous applications that benefit from polyurea coatings. End User (Applications) Segments are divided into the following classifications:

- Building, housing and general construction machinery
- Transportation
- Marine (boats, ships, ocean liners)
- Oil and gas industry infrastructure
- Marine Infrastructure
- Chemical Industries

The details of application of polyurea coatings are described below:

Automotive industry and material handling

The auto industry has used polyurea coatings for more than three decades. The coating is popular because of its impact resistance and other mechanical properties.

Polyurea provides abrasion protection in mining and construction equipment, and for lining dumpers that are used for abrasive materials such as coal and metallic ores. It protects conveyors and rollers of conveyor systems that transport abrasive coal, stones and metallic ores.

It is also used for bed liners for large commercial vehicles and material handling trucks.

Pipelines, pumps and irrigation systems

Polyurea provides corrosion and abrasion protection of pipelines carrying abrasive and corrosive materials. It is applied as a base coating to prevent cathodic dis-bonding.

It is used as a pump coating to reduce cavitation and erosion, and to improve pump output. It is also used to line aquaculture tanks and ponds, and for canal repairs and leakage proofing.

Défense and security sectors

Due to their proven impact resistance, ability to absorb explosive energy, durability and quick setting features, polyurea coatings and linings easily find use in the Défense and security sectors.

Polyurea's application in ballistic missile system is well documented. As a military equipment coating, polyurea can contract and expand with changes in ambient temperature and form a moisture tight seal. Coatings will be free of scratches, dents and abrasion damage, all while ensuring an attractive glossy appearance. A spray coating of polyurea on truck bed liners can reduce vibration and contribute to safety. Coating military buildings with polyurea can minimize damage due to bomb blasts.

Healthcare

In a hospital environment, ideally the floor and wall coverings will be resistant to viruses and bacteria because there is a constant risk of patients acquiring a secondary infection. Cracks, crevices and scratches on the floor can cause moisture seepage and spread dangerous diseases.

Polyurea coatings seal cracks and prevent scratches that might otherwise occur due to frequent scrubbing, thus minimizing the risk of bacterial propagation. These coatings can help maintain sterile conditions in surgical areas, intensive care units and neonatal care units.

Surfaces of steel and concrete bridges

Polyurea is used for the initial coating and as a repair/maintenance coating because of its fast-curing ability, impact resistance, and elongation and tensile strength. Polyurea's structure (molecular chain) makes it an elastomer of high durability. This is the secret of its suitability in construction and other fields

Polyurea coatings can prevent the collapse of concrete structures by effectively repairing a deteriorating portion of the concrete structure and by providing a protective seal around cracking and deteriorating concrete.

7. What Application Methods are best for polyurea

Four application methods are currently used:

A. High pressure hot spray

This method consists of:

- Preparing the surface
- Mixing the component parts
- Performing the coating application
- The high-pressure method is chosen for very high- volume coating jobs. Formulators must prepare a lower viscosity coating at operating temperature to ensure a favourable flow of the fluid within the machine and a uniform thickness on the surface.
- During initial surface preparation, oily contaminants and dirt must be removed by means such as abrasive sandblasting. Surfaces should be checked for cleanliness to ensure strong adhesion of the polyurea coating. This is a critical step to ensure the coating's durability.
- In the mixing stage the prescribed pressure and temperature range must be maintained. Component dosing and mixing must be done with precision. The spray system must be designed to maintain pressure as well as temperature.
- The formulated mixture is sprayed on the clean de-dusted surface. The first coat is produced directly on the surface. A second coat is applied to ensure a leak-proof barrier.
- Machines used for polyurea spray coatings must be able to maintain temperatures up to 80°C (176°F) and pressure up to 210 bars.

B. Warm spray coating

This method is chosen when the volume of the spray coating job is medium and formulators are able to ensure a low viscosity of fluid mix below 60°C (140°F).

C. Low pressure cold spray

In the case of cold spray, formulators must ensure low viscosity at ambient temperatures to enable spray coating. This is a convenient method for small surface area jobs and repairs.

D. Other methods

Roller or brush on methods are used when spraying is not feasible, such as a small pipe interior coating, etc.

8. Limitations and Critical Issues for Polyurea Coatings?

Polyurea coatings do have some limitations and special considerations, as mentioned below:

Limitations:

Because the coating is highly reactive and quick-curing, setting of the coating without adequate wetting out time can cause poor adhesion to the substrate. Formulators must ensure complete wetting out of the surface before the coating sets. It is a tricky situation.

Aromatic polyurea coatings may react to UV radiation, resulting in colour changes and chalking. The aesthetics are negatively affected by UV radiation. For those applications that require visual appeal, an aliphatic polyurea must be used.

Hot spray applications require specialized and sophisticated spray equipment that are able to generate high pressures and high temperatures. Technicians must be specifically trained for this task.

Formulation, primer selection and stringent surface preparation are all critical steps for its success.

Due to technical barriers, customers cannot easily switch from one supplier to another because the after-sale technical services component is crucial for the processes managed by the customer. Polyurea brands in the global market are obviously built on the basis of product innovations and superior control of critical quality control parameters. Developing new formulations of polyurea—tailored to the customer's unique challenges — is the main strategy of the major players in the market.

Regulatory Factors:

Regulatory requirements and growing environmental awareness are compelling buyers to prefer eco-friendly polyurea coating products with no volatile organic compounds (VOCs). High quality product offerings by global polyurea manufacturers have caused a shift in buyer preference in favour of durable, cost-effective and high-quality products.

Technological Developments:

The application portfolio for polyurea is growing continuously because of technological developments, including innovations in materials science and applications techniques and equipment.

Despite its high raw material cost, polyurea systems become highly cost-effective due to their fast curing (even at low temperatures irrespective of high humidity conditions) and superior physical-chemical properties that can be tailored to unique application requirements. For certain end user requirements, polyurea is often the only feasible choice. Because the polyurea coatings are totally free from VOCs, and are compliant with regulatory requirements.

CERAMIC COATINGS

Ceramic coatings go beyond that of conventional organic paints and coatings - their electrical and thermal insulating properties, corrosion resistance and low friction coefficient make them highly versatile. Paint and coating applications have evolved by leaps and bounds over the years. Traditionally, paints were selected based solely on aesthetic appeal and durability. However, with the advent of new technologies there are several innovative and unique options to consider.
Ceramic coatings in particular have drastically changed the paint and coating landscape since their introduction in the 1970s. Several industries including oil and gas, chemicals, construction, aviation, aerospace, automotive and electrical,

rely on ceramic coatings for a number of applications. In this article, we will take a look at ceramic coatings and detail their most common uses across various industries.

What is a Ceramic Coating?

To understand the composition of ceramic coatings, we must first understand what is meant by a ceramic in this context. A ceramic is defined as an inorganic, non-metallic solid material composed of metal or nonmetal atoms held in ionic and covalent bonds. A ceramic consists of metal or nonmetal compounds that have been shaped and hardened by exposure to high temperatures.

Ceramic coatings are paints infused with ceramic microspheres, which are microscopic round ceramic particles that are distributed throughout the coating solution.

As opposed to traditional coatings that contain up to 60% water, ceramic coatings contain a high percentage of solid microspheres. Therefore, most ceramic coatings are classified as high solids coatings since these microspheres occupy a significant portion of the solution by volume.

Due to their high percentage of solids, ceramic coatings are usually thicker and act as a more efficient barrier against extreme weather conditions when compared to oil and water-based solutions.

On the downside, ceramic coatings require more skill to apply. Methods such as detonation guns, oxygen acetylene powder deposition, chemical vapour deposition and plasma spraying are typical methods that are used to apply ceramic coatings to surfaces.

Common Applications for Ceramic Coatings:

Ceramic coatings are quickly becoming a viable alternative to organic and polymer-based coatings for surface protection applications. Although organic coatings are generally less expensive than ceramic coatings and require less skill to apply, they possess limitations that make them unsuitable for use in specific environments.

Listed below are some of the most popular uses for ceramic coatings.

Corrosion Protection

The tough outer shell of a dried ceramic coating chemically bonds to the metal substrate to form a passive and impervious top layer. This layer prevents air and moisture from coming into contact with the underlying metal. With oxygen (the cathode) and moisture (the electrolyte) out of the equation, the oxidation reaction cannot occur, and therefore corrosion cannot occur. This is a form of barrier protection.

In the oil and gas and chemical industry corrosion damage can cost millions of dollars every year. Pipelines and other offshore equipment are typically coated with ceramic coatings to prevent corrosion. This can help extend the equipment's lifespan, minimize repair costs and decrease maintenance downtime.

Friction Reduction

Friction between components can slow machinery parts, increase energy usage, encourage fretting corrosion and decrease equipment lifespan due to accelerated wear and tear.

Ceramic coatings possess a high degree of hardness and a significantly low coefficient of friction. In other words, the coating allows components to "slide" over each other more easily, therefore reducing the amount of frictional force.

Some typical industrial applications for low friction ceramic coatings include pumps, chutes, conveyors, valves and ball bearings.

Electrical Insulation

Ceramic coatings are classified as dielectric coatings, which mean that they are highly resistive to electric current, thus making them very suitable for electrical insulation applications.

Apart from the electronics and electrical industry, electrical insulation materials are also in high demand in the mechanical, industrial and automotive sectors.

Some components that are commonly insulated with ceramic coatings include:

- Handheld tools
- Electrical cable racks
- Circuitry
- Contact bearings
- Engine components, etc,

Thermal Barrier Protection

Overheated metallic components are prone to failures such as thermal fatigue, warping and melting. Thermal barriers are materials that are applied to metallic surfaces operating at high temperatures. Ceramic coatings form an effective thermal barrier that limits the thermal exposure of structural components.

Ceramic coatings are known to withstand temperatures in excess of 1200°F (650°C), with specially formulated composite ceramics withstanding temperatures up to 1600°F (870°C).

In the aviation industry, ceramic coatings are used to insulate turbine alloys from thermal cycling and melting. When used in conjunction with cool air, thermal barriers allow for higher internal combustion temperatures (higher than the melting point of the alloy in some cases) and greater turbine thrust efficiency.

Aesthetics

In addition to its protective properties, ceramic coatings are also used for their naturally vitreous appearance. In the automotive industry, ceramic-

based coatings are preferred over other types of vehicle coatings due to its ability to maintain a glossy finish over a greater length of time.

Moreover, vehicles coated with ceramic-based paints do not require frequent waxing and are easier to clean.

The glossy appearance and durability of ceramic coatings are also used in the dental industry for tooth repair to replicate a natural “pearly white” appearance.

Conclusion

Demand for polyurea is expected to steadily increase as new polyurea coating systems continue to replace alternative coatings. New applications are being continuously developed for these polyurea coatings, replacing some of the competing coatings. Infrastructure spending in emerging economies such as the Asia Pacific region is creating additional demand for polyurea. Increasing populations in tier-2 and tier-3 cities is leading to a construction boom of roads, bridges, houses, malls, tunnels, rail transport systems, airports and shipping ports, all of which drive a steadily growing demand for polyurea coatings and linings.

The versatility of ceramic coatings makes them a viable alternative to traditional organic paints. In some cases, ceramic coatings offer several protective properties that overcome the limitations of organic-based paints. This allows ceramic coatings to be used in situations that are simply not suitable for conventional paints.

Although ceramics can be initially more expensive due to their higher material cost and the cost of equipment and skilled labour required applying them, the reduction in the amount of maintenance and repair operations can result in significant cost savings over the long term.

Exploring Viability, Incentives, and Pilot Models for Green Hydrogen Adoption in India's Chemical Industry

Rahul Nabar & Sanjay Mahajani, Department of Chemical Engineering, IIT Bombay

Recently the Sustainability Hub at IIT Bombay (Research Hub for Green Energy and Sustainability, GESH https://www.geshiitb. in/) organized a roundtable discussion on Green Hydrogen specifically tar- geting the chemicals sector. The event was organized jointly with the Mumbai Region Chapter of the Indian Institute of Chemical Engineers. We provide here a brief summary of the discussions. A more detailed whitepaper on the topic will be published shortly.

Setting the context: Green hydrogen for chemicals – Why now?

Despite significant attention to green hydrogen in sectors like steel, refining, and transport, the chemical industry – both commodity and specialty – has received little focus. Yet, this sector already consumes large volumes of grey hydrogen. This roundtable aimed to examine whether green hydro- gen is now viable for chemical applications, and what incentives or policies might accelerate adoption.

The participants in the Round- table Discussion were carefully invited broadly to present three distinct perspectives:

- Green hydrogen producers and technology vendors – e.g., Aker, Burns & McDonell, CBR Energy, J&K Energy, John Cockrell, L&T, Praj, Pune Hydrogen Valley, Thyssenkrupp Nucera, Waree, Worley.
- Hydrogen consumers from the chemicals sector – e.g., Aarti Industries, Alkyl Amines, Eternis, GAIL, Godrej, HPCL, Ion Exchange, Vinati Organics.
- Experts, think tanks and consulting firms with a practice in the green hydrogen area – e.g., AMAI, CEEW, EY-Parthenon, IESA, KPMG, TERI.

The Indian Chemical Council and the Ministry of New and Renewable Energy also participated along with CSIR-NCL, Pune.

Why chemicals are a prime candi- date for early green H_2 adoption

Globally around 100-mt of hydrogen are consumed annually and per- haps 6-mt in India. Almost all of this hydrogen is grey and the corresponding carbon dioxide (CO_2) emissions would exceed 1 Gigaton per year.

The chemical sector is particularly suited for early adoption of green hydrogen for multiple reasons:

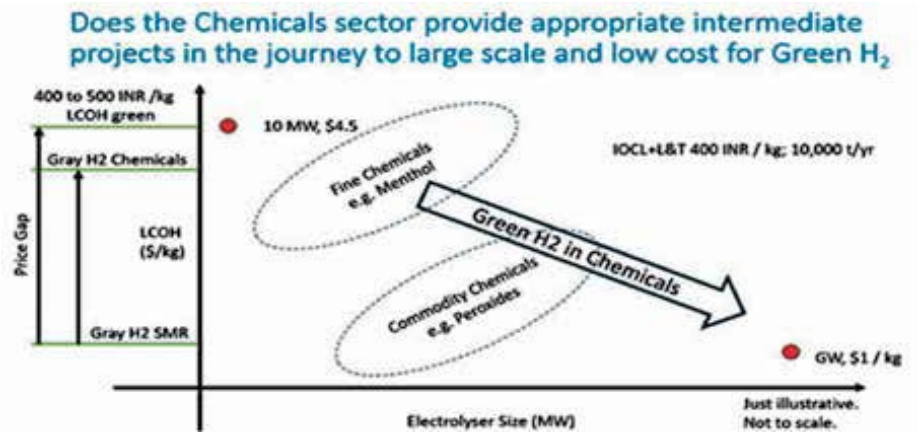
- Non-substitutable demand: Hydrogen is irreplaceable in reactions like hydrogenation, unlike in trans- port (where electric vehicles, EVs, compete).
- Right project scale: Current green hydrogen projects (~10-50 MW) match chemical plant needs.
- High grey hydrogen prices: Smaller producers (typically using methanol reforming) pay Rs. 300-450/kg for delivered hydrogen – making green hydrogen nearly competitive without large subsidies.
- Existing infrastructure: Hydrogen use is well-established; no new permits or infrastructure is needed.

It makes strategic sense to replace existing grey hydrogen uses with green before stimulating entirely new applications.

The business case for switching from grey to green hydrogen

A switch to green hydrogen would be viable for certain sub-segments of the chemical sector specifically for users already paying high prices for grey hydrogen. Green hydrogen pro- ducers cited a current Levelized Cost of Hydrogen (LCOH) of Rs. 400-500/kg, which is within reach for





many chemi- cal producers relying on trucked-in or cylinder H2. Unlike sectors such as mobility or refining (which use highly efficient Steam Methane Reforming, SMR), where cost gaps remain wide, chemical users are closer to parity. For electrolyser manufacturers facing weak demand and underutilization, the chemicals sector presents a timely opportunity.

There's also strong sustainability pressure on chemical companies. While most efforts have focused on renewable electricity or biomass boilers, green hydrogen offers a relatively low-hanging fruit – and the price gap has never been narrower.

The discussion reflected growing optimism among hydrogen producers. The chemical sector, once overlooked due to smaller project sizes, is now seen as a promising and commercially realistic end-use.

Who will pay for green hydrogen?

Of course, chemical producers are always under pricing pressure. It is not reasonable to expect them to switch from grey to green if the business case cannot be made – especially in difficult times like today's market environment.

The question is: Who pays for "green" ultimately?

Specialty chemicals products may use only ~5% hydrogen by weight, so the cost impact on consumer products is minimal. Yet, this benefit isn't being passed upstream to hydrogen users. Voluntary 'Green Hydrogen' certification or procurement pressure on B2C multinationals chasing 2030 net-zero targets could help bridge this gap. If B2C companies legitimately care about their net zero goals it is up to the chemi- cal sector to make th+em pay (a tiny bit!) for green! Solvay is already setting up a plant for green hydrogen peroxide (Rosignano, Italy; commissioning expected 2026) and the BASF's green hydrogen unit is already functional at Ludwigshafen, Germany (commis- sioned March 2025).

These projects give us optimism that with some effort green products in niche areas can sustain a small price premium.

Debunking the lack-of-scale myth

Green hydrogen policy has often overlooked the chemical sector, wrongly perceived as too small to matter. But this is misleading. The largest opera- tional non-China green hydrogen plant today is at BASF in Germany – a chemi- cal site. India's biggest so far, GAIL's 10-MW unit at Vijapur, is also a perfect match for chemical-sector scale, especially in cluster configurations.

These are admittedly modest com- pared to gigawatt-scale announcements like Neom, Saudi Arabia (>2-GW) – but those remain on paper. The real message from current users is clear: let's focus on deployable, working pro- jects. While the megaprojects will need time to fructify, in the interim there's a place for realistic, commercially viable projects of modest scale.

The sector is finally moving from hype to pragmatic deployment, and that's exactly what India's green hydro- gen ecosystem needs right now.

Unlocking economies of scale via industrial clusters

Pooling hydrogen demand across multiple consumers in industrial clusters can significantly improve commercial viability. Centralized plants benefit from economies of scale, lower LCOH, and streamlined regulatory approvals. For risk-averse chemical users, a Build- Own-Operate (BOO) model – where the technology vendor bears the perfor- mance risk – is often more acceptable.

Another promising model involves third-party industrial parks provid- ing green hydrogen as a pay-per-use utility, much like steam, electricity, or water. The Pune Hydrogen Cluster, pre- sented during the roundtable, is a live example: an anchor tenant uses a large share of hydrogen captively, while surplus is sold to nearby chemical units. Some volume is also earmarked for local transport pilots, such as hydro- gen-powered buses. (The cluster is not yet operational).

The Pune model also demonstrates innovative integration: part of its hydro- gen is produced from bio- ethanol via a catalytic process that co-generates ethyl acetate as a green co-product. These niche processes are limited by co-pro- duct demand, but valuable where viable.

The roundtable also flagged other creative cost-reduction ideas. Most green hydrogen plants currently vent

the oxygen by-product, since bottling it isn't viable given the low cost of oxygen produced by Atmospheric Separation Units (ASUs). However, if local chemical users can consume this oxygen stream, it could meaningfully reduce LCOH by valorising the entire output. One such example is the new HPCL green hydrogen project, which plans to explore this route.

Choosing the right sites for green hydrogen pilot projects

A key takeaway from the discussion was the importance of site selection. Green hydrogen is most competitive in plant expansions, where new hydrogen supply is needed and alternatives can be evaluated on a level playing field.

However, location matters. In coastal regions like Gujarat, by-product hydrogen from chlor-alkali plants is abundant and cheap (~Rs. 200/kg). Within a 150-200 km radius of such sites, green H2 will struggle to compete on price. Inland users, who often pay more for trucked-in hydrogen, offer a more realistic target.

Crucially, hydrogen prices vary widely by source and scale, and pilot project viability should not be judged against the lowest-cost grey hydrogen benchmark. Targeting high-cost users gives green H2 the fairest chance to prove itself.

Enabling policy: Incentives that could unlock deployment

Many chemical-sector hydrogen users are unaware of existing subsidies, as early green hydrogen efforts focused on steel and refining. There's much to learn from those sectors – but policy- makers must hear directly from chemi- cal industry stakeholders. Pilot projects and techno-economic studies can help make the case.

Green hydrogen producers also have a stake: a vibrant chemical-sector market could trigger dozens of 1-50 MW projects, helping absorb electrolyser capacity and stabilize demand – especially as uptake in other sectors lags.

The roundtable flagged several policy levers with immediate impact:

- Waiving wheeling and transmission charges for pilot projects (<30 MW) could significantly reduce LCOH, as renewable electricity costs Rs. 4/kWh but surcharges add substantially.
- Lowering subsidy thresholds (currently at 50 MW) would enable smaller, scalable pilots.
- State-level incentives can be decisive, yet vary widely across India.
- Streamlining regulations (e.g., for off-site hydrogen pipelines) would reduce confusion and risk – though such regulatory overlaps are not unique to green hydrogen.

The consensus: if we want real deployment, low-cost, low-barrier pilot support is the quickest way to unlock momentum.

Why chemicals should matter to National Hydrogen Policy

For policymakers, green hydrogen adoption in the chemical sector offers a rare opportunity: projects that are close to commercial viability even without subsidies. In contrast, steel, ammonia, and refining remain far from cost-parity. With modest support, chemical pro- jects can become the first truly bankable examples of green hydrogen use.

Furthermore, green hydrogen projects generate national-level positive externalities: localized, distributed production reduces the need for long-distance road transport of hazardous high-pressure hydrogen gas and large hydrogen storage inventories, thereby enhancing chemical-site safety.

The scale also fits perfectly. Pro- jects in the 10-50 MW range can act as bridging pilots between today's 10-MW operations and the gigawatt-scale ambi- tions of the National Green Hydrogen Mission (NGHM). Investors and minis- tries need proof points, and chemical plants are ideally sized to provide them.

The Experience Curve: Falling costs and future bets

If solar is any guide, green hydro- gen costs will drop sharply. Electro- lyser prices are already falling, and scale will accelerate this trend. For chemical plant expansions, the key question is: Will today's grey hydrogen asset look like a liability in 5-10 years? Taking a calculated bet on green hydrogen now may future-proof investments.

Policies like the European Union's Carbon Border Adjustment Mechanism (CBAM) or domestic carbon pric- ing could further shift the economics. While these factors carry uncertainty, the trend line points in one direction – towards green hydrogen becoming the safer long-term choice.

Turning discussion into deployment: The way forward

This roundtable was a first step toward putting the chemical sector on the green hydrogen map. To translate ideas into impact, we now need sustained follow-up – not just policy engage- ment, but also on-the-ground deploy- ment through pilot projects and hydro- genclusters. This calls for coordination across industry, government, and tech- nology providers.

The path will take time and effort – but the discussions leave us cautiously optimistic that the chemical sector can lead with scalable, commercially viable models.

With the right pilots and modest support, green hydrogen in chemicals can scale fast – and show the rest of the hydrogen economy what commercial success looks like.

(Reproduced with permission from Chemical Weekly June 10, 2025)

Green Hydrogen : A Sustainable Solution to Global Energy and Climate Challenges

D.P. Misra, FNAE, FIChemE, FIIChE, FIE), Jadavpur University Graduate Chemical Engineer (1965)

Abstract

Green hydrogen offers a sustainable, zero-emission solution to global energy and climate challenges. By leveraging renewable sources for hydrogen production, countries can decarbonize key sectors, enhance energy security, and combat the impacts of global warming.



D P Misra a (FNAE, FIChemE, FIIChE, FIE), Jadavpur University graduate Chemical Engineer (1965), has 60 years of experience. His leadership roles include Gen. Manager Krebs India, Dy. M.D., Jacobs Engineering India; M.D., Bharat Process and Mechanical Engineers Ltd. M.D. ORITCO; Director, Tata Consulting Engineers, Director, Development Consultants Pvt. Ltd. He has also served as advisor to Excel Industries, Deepak Nitrite, etc. He was past President, Indian Institute of Chemical Engineers, and former Director General, Indian Chemical Council. Honoured with Lifetime Achievement Awards from the Indian Chemical Council, Indian Institute of Chemical Engineers, and Indian Environment Association.

Introduction

The world is undergoing a significant shift in its approach to energy, transitioning from fossil fuels to renewable sources, and increasingly looking towards non-fossil fuel alternatives like hydrogen. Traditionally associated with industries such as food processing—like in hydrogenated vegetable oils (Dalda)—hydrogen is now being hailed as a game-changing energy carrier in the fight against global warming and climate change. The United Nations Framework Convention on Climate Change (UNFCCC) and global climate change meetings such as COP (Conference of the Parties) play a pivotal role in shaping policies to address these environmental concerns. These decisions are crucial as the world faces the impending impacts of a 4°C rise in global temperatures compared to preindustrial levels.

The Impact of Climate Change

According to UNFCCC predictions, a 4°C rise in global temperatures would result in catastrophic consequences, including:

- Unprecedented heatwaves
- Severe droughts and flooding
- Inundation of coastal cities
- Increased risks to food production, potentially leading to malnutrition
- Water scarcity and increased frequency of high-intensity tropical cyclones
- Irreversible loss of biodiversity, including coral reefs

The present temperature of the Earth is already 0.8°C higher than pre-industrial levels, and the goal set during the Paris Agreement is to limit the increase to no more than 2°C. The consequences of continued global warming are dire, and the need for sustainable solutions has never been greater.

Present Status of Global Warming

The concentration of carbon dioxide (CO2) in the atmosphere continues to increase, sur-passing 391 PPM (parts per million) as of 2012. This rise is mainly due to emissions from fossil fuels. Along with the increasing CO2 levels, global oceans are warming, trapping excess heat, and ice loss in the Arctic has accelerated. Sea levels have risen by about 15-20 cm in the 20th century, and the rate of increase continues at 3.2 cm per decade, with a potential additional rise of 30 cm by the end of this century. Coastal cities such as Shanghai, Mumbai, and

Hydrogen, an abundant and non-polluting fuel, offers significant potential in decarbonizing various sectors. It is produced using a variety of methods, including steam methane reforming (SMR) using natural gas, coal gasification, biomass gasification, and electrolysis.

Kolkata are at risk of submergence.

Furthermore, there has been a dramatic increase in the frequency of heatwaves, and large nations such as Mexico, India, and Indonesia are increasingly vulnerable to floods, economic losses, and climate-related disasters.

India's Action Plan for Climate Change

India, acknowledging the growing challenge of climate change, launched the National Action Plan on Climate Change in 2008. The plan aims to address climate change while promoting sustainable development. Various national missions have been initiated, including:

- National Mission for Enhanced Energy Efficiency
- National Solar Mission
- National Electric Mobility Mission
- National Smart Grid Mission
- National Mission on Advanced Ultra Super Critical Technology
- National Mission on Transformative Mobility and Battery Storage

India has also made significant progress in renewable energy deployment, with 100 GW of grid-connected renewable capacity achieved in 2025. The country's target is to achieve 450 GW by 2030.

Hydrogen: A Key to a Sustainable Energy for Future

Hydrogen, an abundant and non-polluting fuel, offers significant potential in decarbonizing various sectors. It is produced using a variety of methods, including steam methane reforming (SMR) using natural gas, coal gasification, biomass gasification, and electrolysis. However, the current focus is shifting toward "green hydrogen," produced using renewable energy sources like wind and solar power, which can reduce CO2 emissions significantly.Hydrogen's applications are diverse, from fuel cell vehicles to electricity generation and the production of chemicals and fertilizers. Its most significant advantage is the zero-emission nature of its use, especially when green hydrogen is utilized.

Hydrogen Production and Technologies

- Hydrogen can be produced using a range of technologies, including:
- Steam Methane Reforming (SMR): The major plants in India currently use this process. This method uses natural gas or naphtha to produce hydrogen and is currently the most common method.
- Partial Oxidation Using Heavy Fuel Oil: Another method for hydrogen production. This process is utilized in RCF Mumbai
- Coal Gasification: Used in plants such as those at Angul and Talcher, Odisha, for fertilizer production.
- Biomass Gasification and Pyrolysis: Utilizes organic materials for hydrogen production.
- Water Electrolysis: A cleaner process, with plants such as those in Rourkela, Odisha, using electricity to split water into hydrogen and oxygen.
- Byproducts of Chlor-Alkali Manufacture: All Chlor Alkali Plant in India produce hydrogen as by byproducts of chemical processes, such as those at Jaishree Chemicals in Ganjam, Odisha.

Fuel cells, particularly Proton Exchange Membrane (PEM) fuel cells, are emerging as one of the most promising applications of hydrogen. These electrochemical devices convert chemical energy into electricity, with water and heat as byproducts.

The storage and transportation of hydrogen require specialized systems, including compressed gas in underground caverns, cryocompressed tanks, and liquefied hydrogen storage. Transport options include pipelines, tube trailers, liquefied hydrogen trucks, and blending hydrogen with compressed natural gas (CNG).

Hydrogen Fuel Cells: A Revolutionary Energy Solution

Fuel cells, particularly Proton Exchange Membrane (PEM) fuel cells, are emerging as one of the most promising applications of hydrogen. These electrochemical devices convert chemical energy into electricity, with water and heat as by products. During March 2025, hydrogen fuel cell vehicle are just been launched by Tata Motor and Indian Oil. The primary advantages of hydrogen fuel cells include:

- Zero vehicle emissions
- High fuel efficiency
- Quick refueling time (5 minutes)
- Eco-friendly production potential
- Compatibility with existing gasoline infrastructure

Despite these advantages, challenges remain, particularly in terms of safety due to hydrogen's flammability and the relatively nascent state of hydrogen fuel cell vehicles.

Global Hydrogen Program Initiatives

Hydrogen is gaining global attention, with countries around the world embarking on ambitious programs to scale up hydrogen production and utilization. Some key developments include:

- European Union: The EU's Hydrogen Strategy for Climate-Neutral Europe aims to generate 2250 Terawatt Hours (TWh) of hydrogen energy by 2050, with a focus on decarbonizing transport, industry, and heating. This will

significantly reduce CO2 emissions and meet the EU's energy needs.

- Netherlands: The Netherlands is building a green hydrogen facility capable of producing 800,000 TPA by 2040, using offshore wind power.
- Australia: Australia is focusing on its abundant renewable energy resources to produce green hydrogen, with projects such as the Hydrogen Park at Gladstone.
- China: China is investing heavily in solar and wind-powered hydrogen production, with large electrolyser plants to support its growing demand for green hydrogen.
- South Korea: South Korea is positioning hydrogen as a key fuel for the transport sector, including trucks, trains, and airplanes.

Hydrogen Initiatives in India

India is also making strides in the hydrogen space. The country is participating in the global "Mission Innovation" initiative, which aims to accelerate clean energy innovation. The Indian government has initiated the "Hydrogen Valley Platform," a collaborative effort to integrate hydrogen applications into a national ecosystem. The platform will focus on four key areas:

- Hydrogen production
- Hydrogen sharing

India is also making strides in the hydrogen space. The country is participating in the global "Mission Innovation" initiative, which aims to accelerate clean energy innovation. The Indian government has initiated the "Hydrogen Valley Platform," a collaborative effort to integrate hydrogen applications into a national ecosystem.

- Hydrogen utilization
- Addressing cross-cutting issues

Way Forward: Building a Hydrogen Economy

To transition toward a hydrogen-based economy, the following actions are essential:

- Support R&D: Investment in research and development of hydrogen production, storage, and transportation technologies is crucial.
- Develop a Roadmap: A clear strategy for scaling up hydrogen use across sectors must be developed, addressing the socio-economic barriers to adoption.
- Promote International Collaboration: Partnerships between governments, industries, and academia are key to accelerating the hydrogen revolution.
- Policy Support: Governments should introduce policies and incentives to promote hydrogen production, use, and infrastructure development.

The hydrogen economy holds immense promise as a sustainable solution to the world's energy challenges. While the upfront costs are high, the long-term benefits—including a reduction in greenhouse gas emissions, energy security, and a cleaner planet—make hydrogen a critical tool in the transition to a sustainable energy future.

Conclusion

Hydrogen's role in addressing global energy and climate challenges is becoming increasingly important. With ongoing research, technological advancements, and strategic investments, hydrogen can become a cornerstone of the world's energy landscape. The collective global effort to promote hydrogen production, storage, and utilization is essential for mitigating the impacts of climate change and building a sustainable, decarbonized future.

India will be Fastest Growing Economy in the World and at an Even Better Rate-BusinessLine

Despite ongoing global geopolitical challenges, India's economy is expected to maintain its position as the fastest-growing in the world, with potential for even stronger performance, Finance Minister Nirmala Sitharaman has said.

In an interview to businessline, the FM said the Centre is likely to convey to the Finance Commission that its financial position is considered before a decision is made on revising the vertical devolution of funds to the States. The FM simultaneously informed that intense work is under way on GST rate rationalisation and the option of higher GST rate on sin goods post March 31, 2026, cannot be ruled out.

KEY STRATEGIES

The Minister expressed confidence in India's growth trajectory and outlined key strategies to accelerate it further. "We are also, at the macro level, conscious that we need to have more trade agreements, need to open up on very many more sectors, make banks be more amenable for industry and their needs, and make banks understand that credit should be tailored to the requirement of different segments. With all that done, I don't see any reason for us to worry about our growth. We will continue to be the fastest growing at this number or even better number," she said.

While the Economic Survey has projected a growth rate between 6.3 per cent and 6.8 per cent for FY26, the Reserve We need to have more trade agreements, need to open up on very many more sectors, make banks be more amenable for industry and their needs NIRMALA SITHARAMAN, Finance Minister

Bank of India has forecast 6.5 per cent growth.

As various agencies are in the process of completing sovereign ratings, the Minister hoped that they will consider more positive factors such as energy surplus, availability of credit from the banks, mobility and rising purchasing power of people, beside others. "I think there will be a lot more reasons governing their judgment," she said. India has not seen rating upgrades for more than a decade, though outlook has been changed. five- year period starting April 1, 2026, Sitharaman indicated that the Centre will have one more meeting with the 16th Finance Commission to underline its perspective with regard to Central finances. She said that even though the 14th Finance Commission had made recommendations about rationalising CSS (Centrally Sponsored Schemes) while raising the devolution to the States to 42 per cent from 32 per cent, the Centre had not wound them down.

"There are still a lot of projects which Centre is financing despite the Central nd

As the States are pressing for share having come down. higher devolution for the There is definitely an issue of

FINANCE COMMISSION

the Centre borrowing for everything. After all the devolutions and giving away for different categories, it's not left with anything substantial," she said. It may be noted that recommendations regarding devolution are binding on the government. The 15th Finance Commission recommended maintaining the vertical devolution at 41 per cent.

GOODS & SERVICES TAX

As the Goods & Services Tax (GST) regime is set to enter the 9th year of its existence on July 1, the FM gave an insight on the next round of reforms. On rate rationalisation, she said various Groups of Ministers had done their work, but she wants to get into greater details.

"My intention was to undertake a comprehensive exercise, item by item. We want to look at every rate and wherever reduction is possible, we shall bring those rates down.

Equally, we are looking at reducing the number of slabs. What will be the final shape, I can't say but intense work is going on," she said.

(Reproduced with permission from BusinessLine (Mumbai) 30 Jun 2025)

DCM Shriram Ltd. to Acquire 100% stake of Hindusthan Specialty Chemicals Ltd (HSCL) for ₹375 Crores, Eyes Strategic Expansion into Advanced Materials

New Delhi, June 12, 2025: DCM Shriram Ltd's board has given the approval to sign a definitive agreement to acquire full ownership of Hindusthan Specialty Chemicals Ltd (HSCL) for ₹375 crore. This move positions DCM Shriram for strategic expansion into the Advanced Materials segment, unlocking synergies with its existing chemicals portfolio, subject to regulatory and customary approvals.

HSCL, an unlisted subsidiary of Hindusthan Urban Infrastructure Ltd, operates a modern production facility at Jhagadia, Bharuch district, Gujarat. Spread across a 43-acre GIDC plot, the plant is located just 3.5 km from DCM Shriram's existing chemicals complex—offering seamless synergies for integration and growth. In FY 2024-25, HSCL reported a turnover of over ₹ 274 crore, with a Liquid Epoxy Resin capacity exceeding 17,000 KTPA.

Its advanced product portfolio includes liquid epoxy resins, hardeners, reactive diluents, solvent cuts, and formulated resins, catering to high-performance sectors such as aerospace, electronics, renewable energy, electric vehicles, defence, and composites.

Press Release

17.06.2025
Pg 1/2

thyssenkrupp nucera to expand TGV SRAACL's Caustic Soda plant in Andhra Pradesh

TGV SRAAC Limited (formerly Sree Rayalaseema Alkalies and Allied Chemicals Ltd.) has appointed thyssenkrupp nucera to expand their Caustic Soda facilities in Kurnool, Andhra Pradesh. thyssenkrupp nucera will expand the Caustic Soda plant from the existing 1,000 tpd to 1,500 tpd. The scope of the contract covers Engineering and Proprietary Supplies using the group's e-BiTAC technology with Generation 7 elements.

The project involves the installation of 3 additional electrolysers in addition to the 10 electrolysers that the plant currently deploys. The scope of the project also includes setting up a new Chlorine and a Waste Air Dichlorination System, and enhanced provision for the primary and secondary brine purification.

Speaking at the contract signing ceremony held at Kurnool, TG Venkatesh, TGV Group Chairman, expressed his happiness that the project had been signed. 'This is a watershed project for us, especially since it involves expanding our plant significantly. We are convinced of the merits of thyssenkrupp nucera technology, and eagerly look forward to them delivering a state-of-the-art plant.'

thyssenkrupp nucera India's Interim CEO and CFO Kiran Joseph, thanked the customer for their trust in thyssenkrupp nucera's technology, plant engineering expertise, and the state-of-the-art supplies that will be supplied under the contract. 'We are honoured to have been selected to implement this prestigious project, and our team looks forward to beginning implementation. We have always prided ourselves on our ability to offer 'under-one-roof' solutions including after-sales services for the Chlor-Alkali industry,' Joseph said. thyssenkrupp nucera China's CEO Keisho Cho expressed satisfaction that the project would soon be underway. 'We are looking forward to supporting this landmark project with proprietary supplies, and working closely with our India office,' he said.

For thyssenkrupp nucera India, the project serves to underscore the pre-eminent position they enjoy in the Chlor Alkali industry in India.

TGV SRAAC Limited is the flagship company of the TGV Group. It is the leading producer of Chlor-Alkali products and also manufactures Castor Derivatives and Fatty Acids. It also operates a commercial Power Project of 28MW.

Overleaf…

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Corporate Identity Number: U74909MH2023PTC404105 **PAN**: AAKCT1821B **TAN:** MUMT28100C **GST No.**: 27AAKCT1821B1ZO

….2/-



TGV SRAAC Chairman TG Venkatesh and thyssenkrupp nucera India Interim CEO & CFO Kiran Joseph exchange signed copies of the contract in the presence of their respective teams

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About thyssenkrupp nucera:
thyssenkrupp nucera offers world-leading technologies for highly efficient electrolysis plants. The company has extensive expertise in the design, procurement, and construction of electrochemical plants. Its track record includes more than 600 successfully installed projects with a total capacity of more than 10 gigawatts. thyssenkrupp nucera's chlor-alkali electrolysis plants allow significant savings in construction costs and offer fast, simple, and cost-effective assembly. thyssenkrupp nucera successfully made an IPO in July 2023 and is a member of the SDAX of the Frankfurt Stock Exchange.
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Corporate Identity Number: U74909MH2023PTC404105 **PAN**: AAKCT1821B **TAN:** MUMT28100C **GST No.**: 27AAKCT1821B1ZO

Hydrochloric Acid Release due to a Valve Failure

Shoichi Toyonaga, AGC Inc., WCC Global Safety Team

Incident Description:

During a patrol, a hole was discovered in the valve body of the hydrochloric acid supply line, causing a leak. The leak was isolated by closing the valves before and after the leak point.



Investigation Results and Root Cause(s), Contributing Factor(s):

When the leaking valve was opened, we found a large part of the internal glass lining (around the sealing surface with the diaphragm membrane) peeled off. As a results, the cast iron was exposed as base material to HCl and caused its thinning. However, the other remaining lining was thick and in good condition.

Based on the localized peeling of the glass lining and the renewal history, it is presumed that microcracks appeared in the glass of the glass lining when the valve was opened and closed, and that hydrochloric acid penetrated the back of the glass lining, causing corrosion of the base material and leading to the hole.

Corrective Action(s) & Lessons learned:

As a future measure, the glass-lined diaphragm valves used in the hydrochloric acid equipment will be updated to rubber-lined diaphragm valves.

(WCC GST Newsletter 67 and reproduced with permission from WCC GST)

Incident Report: 148

Chlorine Gas leak Incident in the OHT (Overhead Tank) premises of Hosur City Municipal Corporation (HCMC) in the Krishnagiri district of Tamil Nadu

Hari Saran Das, Honorary SHE Advisor, AMAI

INCIDENT

On 24th January 2025, Friday, at around 9 pm, Chlorine gas leaked from a chlorine cylinder while drawing chlorine from the cylinder for mixing with the overhead tank (OHT) water in the OHT premises in the Hosur City Municipal Corporation (HCMC). Hosur is located in Krishnagiri District of Tamil Nadu. It is the largest city in the Krishnagiri District and is also a satellite town of Bangalore.

The gas leaked when the cylinder valve was opened for drawing chlorine gas for disinfecting the water. The leaked chlorine gas spread to the nearby locality. Residents in the area were affected after inhaling leaked chlorine gas. A few residents from Lakshmi Narayanan Nagar and Eswar Nagar felt slight eye irritation, sore throat, breathing difficulty and vomiting after inhaling leaked chlorine gas. Following the gas leak, there was panic in the area. Residents came out of their houses to open area.

There are over 2,500 houses in Lakshmi Narayanan Nagar, Eswar Nagar and its vicinity in the Hosur City Municipal Corporation (HCMC). An OHT (Overhead Tank) with a capacity of 5 lakh litres in the Hosur City Municipal Corporation caters to these areas. Water is supplied to the house holds of the locality from this OHT. The water is disinfected before it is supplied by mixing with chlorine gas drawn from a chlorine cylinder.

INCIDENT CONTROL

Residents informed the chlorine leakage incident to the Hosur Fire and Rescue Department. HCMC officials, police, and fire fighters responded to the incident and resolved it around 11:30 pm.

A team of fire-fighters led by D Naga Vijayan from SIPCOT fire station reached the spot and stopped the leak by dumping the gas cylinder into a small water tank.

ROOT CAUSE

The cylinder was in use at the spot from which chlorine was being drawn for a long time for water treatment. The cylinder was near empty. Only few KGS of gas was left in the cylinder when the incident happened. The valve was handled frequently to open and stop gas flow, which may have damaged the cylinder valve resulting chlorine leakage. The operator most probably could not close the valve and left it in open and the Chlorine leakage from the cylinder continued. The other reason of leakage maybe use of Improper tools for handling the cylinder valve.

Recommendations/Lessons Learnt

- Cylinder valve should not be used for controlling gas flow. One more process valve has to be installed for controlling the gas flow from the cylinder. Frequent opening and closing will damage the cylinder valve.
- The operator should wear proper gas mask while opening or closing the cylinder, so that incase of chlorine leakage, he can close the valve.
- Non-Standard or worn-out tools shouldn't be used for opening / closing the cylinder valve. This may damage the valve resulting leakage.
- Only trained person should handle chlorine cylinders.
- Proper emergency safety kit should be available for controlling chlorine leakage.
- Chlorine neutralisation pit with caustic soda solution should be provided at the chlorine handling site. In case of cylinder leakage, the chlorine of the cylinder should be neutralised in caustic soda solution using the safety kit.
- Leaking chlorine cylinder should never be dumped in water tank. The leakage will worsen.
- People /Residents should be informed to stay away in the opposite wind direction.
- People affected with chlorine gas should be provided with first aid and may be admitted to hospital for treatment.
- Fire fighting staff may also be informed about safe handling of chlorine.

(Hari Saran Das, Honorary SHE Advisor, AMAI prepared the above report based on the information published in Express News Service/Times of India 26th Jan 2025)

Process Safety Beacon
Messages for Manufacturing Personnel
www.aiche.org/ccps/process-safety-beacon

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aiche.org/ccps

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Operational Readiness Reviews

June 2025

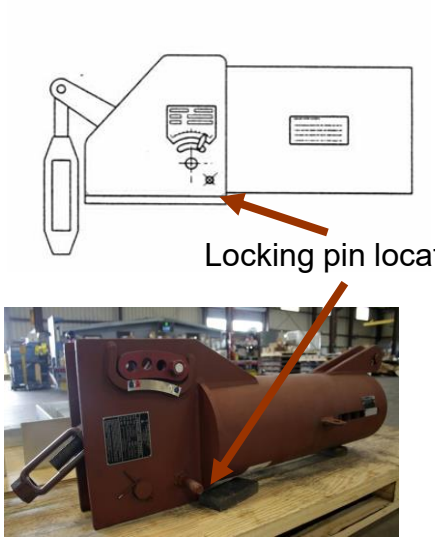


Figure 1. Spring hangers

A large plant was restarting after hydrotesting the steam superheater coils on a reformer furnace. No modification had been made to the coils. The locking pins on spring hangers for the pendant superheater were installed to support the extra weight of the water during the test. A step in the restart procedure to remove the pins was missed and they were not removed before heating was restarted.

As the heating of the reformer furnace continued, the superheater coils could not expand due to the locked spring support. An operator heard an abnormal noise from the coil area and reported it.

Operators halted the restart, removed the locking pins, and resumed the restart with no additional problems

Here, there was no modification to the superheater coils to require a Pre-Start-up Safety Review (PSSR), but an Operational Readiness Review (ORR) could have found the locking pins before the start-up was begun.

Did You Know?

- Restoring equipment to service is a dangerous activity since many systems may not be in their normal operating mode or position. Even equipment that has been off-line for a few hours can present hazards.
- An Operational Readiness Review (ORR) should be conducted when starting equipment that has been idle, even if nothing was modified.
- A Pre-Start-up Safety Review (PSSR) should verify that all systems are ready before starting or restarting new or modified equipment. A PSSR must ensure that the modification was completed according to design or that any changes were reviewed by MOC and are documented on redline drawings.
- Both a PSSR or ORR must be done BEFORE the hazardous materials are added to the system to avoid problems that could require clearing the system again to fix the problems.
- The most frequent problems from poor PSSRs or ORRs are: drains or bleeder lines left open, wrong motor rotation, instruments still in bypass mode, procedures do not match the new/modified equipment.
- When starting a large system, several reviews may be required to verify each part of the operation is ready before starting the entire system.

What Can You Do?

- Take the time to verify each item on the PSSR or ORR checklist is done before signing it off.
- If there are items missing on the PSSR or ORR checklist, bring them to the attention of your supervisor.
- Follow the company's Lockout and line break procedures when removing isolation devices.
- Document your actions on the PSSR form and unit logbook so others know what was done and when it was completed.

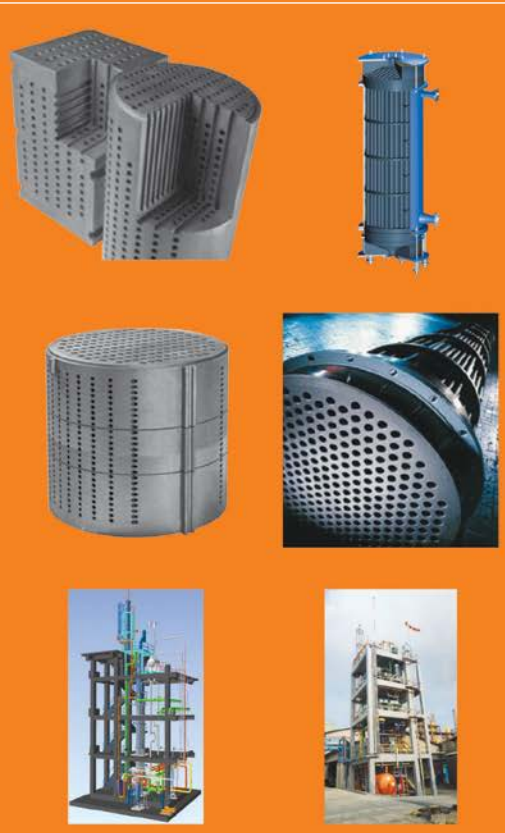
Operational Readiness Reviews Differ from PSSRs

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Lining Products:

- Pipe and fittings, Strainers – Basket / Y / T
- Bellows, Compensators, Valves – Ball Butterfly, Dia
- Dip Pipe, Spargers, Dip Tubes

PTFE lined equipments:

- Columns, POTs,
- Vessels, Tanks,
- Shells, Customized Equipment

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

Graphite:

- Heat Exchangers, Condensers, Absorbers
- Heaters / Coolers, Reboilers / Evaporators
- Silicon Carbide Heat Exchangers

Systems Package Solutions :

- HCl Synthesis Package, Dry HCl Gas package
- HCl Absorption package, H2SO4 Dilution
- Skid operated plants / Pilot Plants

Graphite material: • Vibro and Iso molded

Key Points:

- Largest processor of India for lined piping and equipment,
- Have large sizes in seamless lining upto 1600 mm (64")
- All fittings in single piece and longer length pipes upto 6 mtr to avoid joint and leakages,
- Well equipped facility for Graphite equipment with inhouse design (mechanical and process)
- High end Graphite used for equipment longer life,

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

NEWS DIGEST

General

Global trade witnesses uptick in early 2025 anticipating US reciprocal tariffs

Business Line | 27 June 2025

Global trade in goods witnessed a "strong uptick" in early 2025 with importers front-loading purchases ahead of the anticipated higher tariffs by the US, according to the latest reading of the WTO goods trade barometer. However, a slowing down of new export orders suggests that the growth momentum may not be sustainable, according to a WTO statement.

"The latest WTO goods trade barometer rose to 103.5 — up from 102.8 in March, while the forward looking new export orders index fell to 97.9, pointing to weaker trade growth later in the year," it noted.

The goods trade barometer provides real-time information on the trajectory of merchandise trade relative to recent trends. Barometer values greater than 100 are associated with above-trend trade volumes, while barometer values less than 100 suggest that goods trade has either fallen below trend or will do so in the near future.

"World merchandise trade volume growth moderated in the fourth quarter of 2024 but it is likely to rebound in the first quarter of 2025 based on the goods barometer and preliminary trade data," the statement said.

The WTO Secretariat's global trade outlook, published on April 16 2025, projected stable trade growth of 2.7 per cent for 2025 under a low-tariff scenario reflecting policy conditions at the start of the year, and a contraction of 0.2 per cent under actual policies in place as of mid-April. "Subsequent developments, including US-China and US-UK trade agreements as well as higher tariffs on steel and aluminium, have nudged the forecast up and down slightly leaving the overall outlook basically flat at 0.1 per cent. However, trade contraction is possible, for example, if US reciprocal tariffs are reinstated, or if trade policy uncertainty spreads globally," the statement cautioned.

US President Donald Trump announced reciprocal tariffs on a large number of countries on April 2, based on trade deficits, which he paused for a 90-day period.

https://www.pressreader.com/india/businessline-kolkata-9WVY/20250627/281784225079469?srsltid=AfmBOoqHAnLYcVLmKEueZbfcNiayNJ0igM936GV9QRVkSQfVjHU-Isck7

India-US trade talks hit a roadblock; time for PM Modi and Trump to intervene?

Financial Express | 26 June 2025

Trade negotiations between India and the United States have run into serious roadblocks, according to a report by Reuters. Just weeks before the July 9 deadline for US President Donald Trump's proposed 26 per cent reciprocal tariff to take effect, disagreements over import duties on steel, auto parts, and agricultural products have delayed progress on a trade deal.

Reuters reports that the US is demanding that India commit to lower import tariffs on farm goods such as soybeans and corn, as well as automobiles and alcoholic beverages. It also wants India to relax certain non-tariff barriers. Indian officials say these demands are proving difficult to meet without clear commitments from the US side.

India is pushing for a waiver from the upcoming 26 per cent reciprocal tariff and also wants the US to reduce existing tariffs on Indian steel and auto parts. However, American negotiators have not agreed to these demands so far, three Indian officials told Reuters.

https://www.financialexpress.com/policy/economy-india-us-trade-talks-hit-a-roadblock-time-for-pm-modi-and-trump-to-intervene-3893844/

GST Council set to discuss reducing items in 12% slab

The Hindu | 26 June 2025

The agenda for the Goods and Services Tax (GST) Council at its next meeting will include deliberations on minimising the 12% tax slab and also finalising the tax treatment on service intermediaries, which could provide the sector relief worth thousands of crores, according to informed sources.

Further, while the meeting was initially supposed to be held in June, there has been some back-and-forth between members of the Council over the location of the meeting, leading to delays. It will now likely be held in July 2025, which would be more than six months after the last meeting, which was held in December 2024 in Jaisalmer. According to the rules, the GST Council is meant to meet once every quarter, or three months.

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https://www.thehindu.com/business/Economy/gst-council-set-to-discuss-reducing-items-in-12-slab/article69735489.ece

U.S. economy shrank 0.5% between January and March, worse than earlier estimates revealed

The Hindu | 26 June 2025

The U.S. economy shrank at a 0.5% annual pace from January through March as President Donald Trump's trade wars disrupted business, the Commerce Department reported (on June 26, 2025) in a downgrade from its previous estimate.

First-quarter growth sank under a surge of imports as companies in the United States rushed to bring in foreign goods before Mr. Trump could impose tariffs on them. The Commerce Department previously estimated that the economy fell 0.2% in the first quarter.

https://www.thehindu.com/business/us-economy-shrank-05-between-january-and-march-worse-than-earlier-estimates-revealed/article69740543.ece

Indian firms lead e-invoicing adoption among 6 major economies: Study

Business Standard | 26 June 2025

Indian companies lead in e-invoicing adoption and market penetration among businesses surveyed from six countries, including the US and the UK, according to a study.

Indian companies reported more than 80 per cent of invoices are received electronically, outpacing the global average of 71.5 per cent, claimed the study of 1,720 businesses across six major markets - the US, the UK, France, Germany, India, and Australia.

The study was conducted by tax compliance firm Avalara and the Center for Economics and Business Research (Cebr).

It stated that full-scale adoption of e-invoicing by Indian firms could unlock approximately ₹ 32,035.71 crore in annual economic value and save the average Indian business approximately ₹1.09 crore each year driven by productivity gains, reduced fraud, and faster payments.

https://www.business-standard.com/india-news/indian-firms-lead-e-invoicing-adoption-among-6-major-economies-study-125062600900_1.html

Marginal increase in PLI funds release

Financial Express | 25 June 2025

The government has released Rs 2,746 crore to the beneficiaries under the Production Linked Incentive (PLI) scheme so far in the current financial year, taking the overall payout since its inception of the scheme to Rs 21,534 crore.

This represents a marginal rise in the pace of PLI funds release. In FY25, the disbursement was Rs 9,067 crore.

Till the end of the last financial year the disbursements under the Rs 1.97 lakh crore scheme stood at Rs 18,788 crore. In the first two years of the scheme only Rs 9721 crore was disbursed – Rs 2968 crore in 2022-23 and Rs 6753 crore in 2023-24.

In the review meeting of the scheme, commerce and industry minister Piyush Goyal stressed on preparing a road map for the next five years both on investment and disbursement.

Notably, PLI Scheme is under various stages of implementation in 14 key sectors, and witnessed investments worth Rs 1.76 lakh crores. This has generated production/ sales of over Rs 16.5 lakh crore and employment of over 12 lakhs (Direct & Indirect) till March 2025, as per the government data.

https://www.financialexpress.com/business/industry/marginal-increase-in-pli-funds-release/3892790/

Rate rationalisation will improve GST system

Business Line | 25 June 2025

Goods and Services Tax (GST) completes eight years on July 1, 2025. Introduced to streamline the indirect tax regime, GST replaced multiple Central and State levies with a unified tax structure. By eliminating the cascading effect of taxes, it laid the foundation for a common national market — realising the vision of "One Nation, One Tax."

Among the key achievements, the most significant is the expansion of the taxpayer base. Registered taxpayers rose from 67.83 lakh to 1.47 crore as of August 2024, reflecting deeper formalisation of the economy. This has been accompanied by a rise in monthly GST collections, which are consistently nearing □2 lakh crore.

Another success has been the significant digital enablement. GST has streamlined critical processes such as registration, return filing, tax payments, and refunds. Further, the implementation of e-way bills, e-invoicing, and invoice matching has improved compliance and reduced evasion. The role of the GST Council and operationalizing the GST Appellate Tribunal (GSTAT) are major milestones.

https://www.thehindubusinessline.com/opinion/rate-rationalisation-will-improve-gst-system/article69733022.ece

S&P raises India's FY26 GDP growth estimates to 6.5%

The Hindu | 24 June 2025

S&P Global Ratings raised India's GDP forecast for current fiscal to 6.5% assuming a normal monsoon, lower crude oil prices and monetary easing.

S&P, also, flagged rising risks to the global economy due to the turbulence in the Middle East saying long-lasting major increases in oil prices could have significant economic impact in Asia-Pacific, notably via slower global growth and pressure on the current accounts of net energy importers, prices and costs.

India is 90% dependent on imports to meet its crude oil needs and buys roughly half of its natural gas from overseas.

S&P's growth estimates for India is in line with the projections made by central bank RBI earlier this month at 6.5%.

In the report, S&P said it expects the increase in US import tariffs and the uncertainty about them to harm trade, investment and growth globally.

https://www.thehindu.com/business/Economy/sp-raises-indias-fy26-gdp-growth-estimates-to-65/article69730536.ece

Asean delaying review of trade pact with India: Source

Financial Express | 23 June 2025

The 10-nation Association of Southeast Asian Nations (ASEAN) is stonewalling the review of the goods trade agreement with India and even after the nine rounds of negotiations, the process is far from complete, a senior official said.

Both sides are working towards the 2025-end deadline for completing the review of Asean India Trade in Goods Agreement (AITIGA) and with just six months remaining, the movement has been very slow.

Within five years of the agreement on goods being activated in 2010 India had started asking for a review of the pact as its imports from Asean zoomed but it could not derive the expected benefits. It took India four years to bring Asean around to the need of review of the AITIGA.

An official said in the AITIGA while India slashed duties up 71% of its traded products, Indonesia brought tariffs down on just 41 % of the products, Vietnam 66.5% and Thailand 67%. These countries had higher per capita income than India but even then, New Delhi agreed to more concessions than the Asean members, the official added.

Recently commerce and industry minister Piyush Goyal had said that it was "silly" on India's part to sign an FTA with Asean which is now being used to route Chinese products into India.

Since AITIGA became operational, the trade deficit with Asean widened from $ 4.98 billion in 2010-11, the first full year of operation of AITIGA to $ 44.20 billion in 2024-25. India's exports to the region fell 5.77% on year in 2024-25 to $ 38.96 billion while imports grew 5.65% to $ 84.16 billion.

https://www.financialexpress.com/policy/economy-asean-delayin-greview-of-trade-pactwith-india-source-3890333/

India's private sector: PMI surges to a 14-month high of 61.0; strong demand lifted activity in June

The Times of India | 23 June 2025

India's private sector activity showed strong momentum in June, reaching its fastest pace in over a year, as firms ramped up production to meet booming domestic and international demand. These figures marked nearly four straight years of growth, fresh survey data released on Monday.

The HSBC Flash India Composite Purchasing Managers' Index (PMI), compiled by S&P Global, jumped to a 14-month high of 61.0 from May's 59.3.

Both manufacturing and services saw strong gains. The services activity index rose to 60.7 from 58.8, its strongest reading since August 2023, while the manufacturing PMI climbed to 58.4 from 57.6, driven by strong output and a spike in new orders.

https://timesofindia.indiatimes.com/business/india-business/indias-private-sector-pmi-surges-to-a-14-month-high-of-61-0-strong-demand-lifted-activity-in-june/articleshow/122027140.cms

India curbs import of gold-rich alloys, colloidal metals

Hindustan Times | 20 June 2025

India has restricted import of some gold alloys exceeding more than 1% gold in weight and certain colloidal precious metals "to regulate import of gold in the garb of chemical compounds or any other form" but industrial users can import such alloys against an import authorization, an official said. "The import restrictions are applicable on palladium, rhodium, and iridium alloys in any form (unwrought or powder) consisting of more than 1% gold," he said, asking not to be named.

Import of colloidal precious metals are also restricted, he said. According to experts, colloidal precious metals are suspensions of gold or silver nanoparticles dispersed in a liquid.

"The Directorate General of Foreign

Trade (DGFT), Ministry of Commerce and Industry, has issued Notification No. 18/2025-26 dated 17th June 2025, to restrict import of alloys of Palladium, Rhodium, and Iridium containing more than 1% gold by weight," it said.

The restrictions have been imposed because of rising gold imports. India's gold imports jumped by over 27.3% from $45.54 billion in 2023-24 to $58 billion in 2024-25.

https://www.pressreader.com/india/ht-navi-mumbai/20250620/282145002319104?srsltid=AfmBOoql2SnSI_6v1GiZ_25Dkqu8WXQhKjqn3twpoBxU0x6USTPSzSg6

Govt seeks industry inputs on problems in India-ASEAN FTA utilisation

Business Line | 19 June 2025

In a bid to increase Indian exporters' utilisation of the India-ASEAN free trade agreement, which is way below 50 per cent, the government is collecting inputs from the industry to understand the possible reasons behind the underutilisation or non-utilisation to rectify the problems.

Formally known as the ASEAN-India trade in goods agreement (AITIGA), the free trade pact implemented in 2010 has resulted in a steady widening of trade deficit between India and the ten-member bloc. The members include Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Laos, Myanmar and Cambodia.

India's exports to the ASEAN bloc declined 5.7 per cent to $38.96 billion in FY25 while imports increased 5.6 per cent to $84.16 billion, increasing the trade deficit to $45.2 billion from about $8 billion in 2010.

Moreover, more than half the exports taking place from India to the ASEAN countries are happening outside the free trade framework with exporters paying regular import duties (MFN rates) and not the preferential or zero-duties agreed under the pact.

https://www.thehindubusinessline.com/economy/govt-seeks-industry-inputs-on-problems-in-india-asean-fta-utilisation/article69713798.ece

Premiums for marine cargo insurance rise by up to 30%

The Indian Express | 18 June 2025

Following the Russia-Ukraine conflict, the escalating tensions between Iran and Israel have up marine cargo insurance premiums, amid growing war-related risks and the to global shipping and trade routes. Marine cargo insurance premium has now gone up by 15 per cent to 30 per cent and insurers are now charging an percent of the cargo' s value, insurance sources said.

The rise in premium is expected to impact importers of commodities and exporters from ports in Gujarat and Maharashtra.

Red Sea exposure premiums began rising after the Russia Ukraine war, well before the recent Iran-Israel conflict, the sources said. the earlier escalation had already led global underwriter store evaluate maritime risks, and the latest surge in tensions has further intensified concerns — particularly in the Red Sea, a vital corridor for global oil and cargo trade.

For example, a Rs 50 crore shipment that previously had a base premium of Rs 1.5 lakh now costs around Rs 6.5 lakh with Red Sea war coverage, a significant rise that can strain the finances of small and medium enterprises (SMES).

https://www.pressreader.com/india/the-indian-express/20250618/282097757674309?srsltid=AfmBOorFlcXvjWVmiBCUsvLn4L0M0niw0i9Ub7l-NSPqN7Ee6a49zJFZ

Tariff war realigning global trade flows

Hindustan Times | 18 June 2025

The US-China trade war is showing early signs of a realignment in global trade flows—including more Chinese exports being redirected to India, raising alarm among experts, even as India's shipments to the US surged.

China's exports to the US plummeted 34.5% year-on-year to $28.8 billion in May from $44 billion a year earlier, show data released by China's General Administration of Customs on 10 June.

This, however, was offset by China's rising exports, including to members of the Association of Southeast Asian Nations (up 15% on-year to $58.4 billion in May), and the European Union (up 12% to $49.5 billion), the data showed. As per data released by India's commerce ministry on 16 June, India's imports from China rose 21.7% to $10.32 billion in May from $8.48 billion a year earlier, driven by higher inflows of electronic goods, machinery, chemicals, and project-related equipment.

Meanwhile, India's imports from the US declined to $3.63 billion in May from $3.85 billion a year ago, while exports to the country grew 17.3% year-on-year to $8.8 billion, led by higher shipments of smartphones and electronics.

While these data sets highlight India's strategic position in an evolving global supply chain as American buyers diversify sourcing away from China, the redirection of Chinese exports to non-US markets raises fresh concerns about potential dumping and unfair trade practices in alternative markets.

India's overall merchandise imports fell 1.8% to $60.6 billion in May from $61.7 billion a year ago mainly due to lower shipments of oil, gold, and diamonds. Excluding these three categories, India's imports jumped 12%, rising from $36.8 billion to $41.2

billion.

This trend is also visible in tax collections. India's earnings from Integrated GST (IGST) on imports jumped 72.9% to ₹42,370 crore in May from ₹ 24,510 crore a year earlier. Since petroleum products are not taxed under GST, this sharp increase mainly reflects a rise in imports of other goods like electronics, machinery, and industrial products.

https://www.pressreader.com/india/hindustan-times-lucknow/20250618/282209426823046?srsltid=AfmBOoomUpOK-L2wFHSvEPFqqh7RB4C0Z-V4aTKf1syY0klnnmlsbtmoR

India's exports show consistent & steady growth from 2010 to 2023

Millennium Post | 18 June 2025

India's export trajectory from 2010 to 2023 has shown a consistent and steady upward trend, reflecting the resilience and dynamism of its trade sector, an official said. Citing an UNCTAD report, the official said that over the period from 2010 to 2023, India has been one of the fastest-growing major economies in terms of its share of global exports, achieving a growth rate of 6.3 per cent. "This rate of growth is the highest among all major economies as reported by UNCTAD key statistics and trends in international trade 2024," the official added.

This performance stands out even more when compared to other leading economies such as the EU, China, and the US, which recorded lower export share growth rates of 3.9 per cent, 6.1 per cent, and 3.9 per cent respectively during the same period. "While some advanced economies like Japan and Russia experienced only marginal increases or stagnation in their export shares, India's export trajectory has been marked by a consistent and steady upward trend, reflecting the resilience and dynamism of its trade sector," the official said.

This reflects the effectiveness of India's trade policies, manufacturing and services sectors, and the impact of export promotion initiatives, which have contributed to enhancing India's integration into global supply chains. Total exports in 2009-10 was $274.8 billion. It touched $776.3 billion in FY23 and 825 billion in FY25.

https://www.millenniumpost.in/business/indias-exports-show-consistent-steady-growth-from-2010-to-2023-615337

Exporters raise alarm as shipment costs jump up to 50% amid conflict

Live Mint | 16 June 2025

As the Israel-Iran conflict has already increased shipment costs by up to 50% and threatens to disrupt trade routes across West Asia, the government will talk to exporters to assess the impact and chart a response, three officials aware of the development told Mint.

The discussions will be aimed at safeguarding India's exports to the United Arab Emirates, Saudi Arabia, Qatar, Oman, Iran, Iraq, Kuwait and Israel, along with major European markets, the officials said on the condition of anonymity.

The conflict has escalated concerns over the safety of cargo passing through the Strait of Hormuz and the Red Sea, a critical maritime corridor for Indian exports. Shipping delays, rising freight charges and limited insurance coverage are being flagged by exporters and trade bodies, they said.

https://www.pressreader.com/india/mint-hyderabad/20250616/281702620678582?srsltid=AfmBOoqx6f4FTutG0X7_DFBCtHhwYSdKn1nnrsS-bpC_OIwRHCacJb5_i

Hopeful of initial India-US trade deal by July 9: Commerce Secy

The Tribune India | 16 June 2025

Negotiations for the proposed India-US trade agreement are in good progress and the two sides are expected to agree on an early tranche of the pact before July 9, a top government official said.

"We are working on the early tranche and as you are aware that there is a date (July 9), before that we would like to conclude this early tranche," Commerce Secretary Sunil Barthwal told reporters.

He said that Indian and the US teams are making visits to each other's country for trade talks.

"We also visited the US twice. The US team also came here twice. There is good progress and we are hopeful that this will be done within the timelines," he added.

The US on April 2 imposed an additional 26 per cent reciprocal tariff on Indian goods but suspended it for 90 days till July 9. However, the 10 per cent baseline tariff imposed by America remains in place. India is seeking full exemption from the additional 26 per cent tariff.

India is seeking duty concessions for labour-intensive sectors such as textiles, gems and jewellery, leather goods, garments, plastics, chemicals, shrimp, oil seeds, grapes, and bananas in the proposed trade pact.

The US, in turn, wants duty concessions on certain industrial goods, automobiles - especially electric vehicles, wines, petrochemical products, dairy, and agricultural items like apples, tree nuts, and genetically modified crops.

https://www.tribuneindia.com/news/top-headlines/hopeful-of-initial-india-us-trade-deal-by-july-9-commerce-secy/

India's total exports rise by 2.77%, trade deficit narrows to USD 6.62 billion

The Statesman | 16 June 2025

India's total exports—combining merchandise and services—rose to USD 71.12 billion in May 2025, marking a 2.77% year-on-year increase, according to data released by the Ministry of Commerce and Industry.

In comparison, total exports in May 2024 stood at USD 69.20 billion. The growth was driven by a sharp increase in services exports, which rose to USD 32.39 billion in May from USD 29.61 billion a year ago. However, merchandise exports declined marginally to USD 38.73 billion, down from USD 39.59 billion in the same month last year.

India's overall imports (goods and services combined) dipped slightly to USD 77.75 billion in May 2025 from USD 78.55 billion a year earlier. As a result, the trade deficit narrowed significantly to USD 6.62 billion in May from USD 9.35 billion in May 2024.

During the first two months of the ongoing financial year 2025-26 (April–May), India's total exports reached USD 142.43 billion, a 5.75% increase compared to the same period last year. Imports during the same period stood at USD 157.57 billion, up 6.52% year-on-year.

The trade deficit for April–May widened slightly to USD 17.14 billion, compared with USD 15.12 billion in the same period of FY25.

India's total exports for the full financial year 2024-25 hit an all-time high of USD 824.9 billion, exceeding the government's initial target of USD 800 billion. This marks a 6.01% rise over the USD 778.1 billion recorded in FY2023-24.

The growth was largely led by the services sector, with exports reaching a historic USD 387.5 billion, up 13.6% from USD 341.1 billion in the previous year. Merchandise exports, meanwhile, stood at USD 437.42 billion, registering a marginal year-on-year increase.

https://www.thestatesman.com/business/indias-total-exports-rise-by-2-77-trade-deficit-narrows-to-usd-6-62-billion-1503446021.html

Fiscal deficit may stay below estimate at 4.2-4.3% of GDP

Live Mint | 16 June 2025

The Centre is likely to narrow its fiscal deficit to 4.2-4.3% of gross domestic product (GDP) in 2025-26, better than its target of 4.4%, driven by higher-than-anticipated dividends from state-run enterprises, banks and the Reserve Bank of India (RBI).

A narrow gap in revenue and expenditure will provide the central government with added fiscal space to maintain capital spending to keep the growth engine humming, two people aware of the development told Mint.

While the 2025-26 budget pegs the fiscal deficit at 4.4% of GDP, the actual figure is likely to come in lower, much like in 2024-25, said the first official cited above on the condition of anonymity. "This reflects the government's commitment to fiscal discipline even as it balances growth imperatives," the person said.

"Stronger revenue flows will allow room to outperform targets without compromising on capital expenditure," the person added.

The Centre adopted a fiscal consolidation roadmap in 2021-22 to reduce the fiscal deficit to below 4.5% of GDP by 2025-26. India's fiscal deficit stood at 4.8% for 2024-25.

A higher fiscal deficit raises debt and debt servicing, which strains the economy and risks devaluing the currency and impacting private investments.

https://www.pressreader.com/india/mint-ahmedabad/20250616/281715505580424?srsltid=AfmBOor16StAFefh-LKu9DpYitB_eIcT8-HV_243LrTKG5RqjXKPMyvr

GST Council may replace compensation cess with health and clean energy cesses

CNBC TV 18 | 16 June 2025

The GST Council is likely to consider a major restructuring of the cess regime, with plans to replace the existing compensation cess with two new levies — a Health Cess and a Clean Energy Cess — once the current cess expires on March 31, 2026, highly placed sources told CNBC-TV18 on the condition of anonymity.

The proposal is expected to be routed through the Group of Ministers (GoM) on Compensation Cess, chaired by Minister of State for Finance Pankaj Chaudhary. According to sources, the GoM is likely to take up the matter in its upcoming meeting, which is expected to be scheduled soon.

"Following the GoM's deliberations, the GST Council will hold its meeting to deliberate on the proposal and the GST Council is likely to be convened before the Monsoon Session of Parliament," sources added.

The compensation cess—levied to offset states' revenue losses after the rollout of GST in July 2017—is set to lapse legally in March 2026. The cess was initially meant to end in June 2022 but was extended to repay loans taken to meet the compensation shortfall during the pandemic years.

While the proposed cesses may help align taxation with broader welfare goals, their success will depend on political consensus, constitutional backing, and a balanced revenue-sharing arrangement that keeps both the Centre and states on board.

https://www.cnbctv18.com/business/finance/gst-council-may-replace-compensation-cess-with-health-and-clean-energy-cesses-ws-l-19621565.htm

India in dumping crosshairs at WTO as US, Pak target exports

Live Mint | 14 June 2025

The US, Brazil and Pakistan have initiated antidumping measures against India, which has been fighting its own battle against low-priced products flooding domestic markets.

Trade experts suggest some of these measures may be strategic, signalling a growing wave of trade defense actions against India and aimed at influencing New Delhi's trade negotiations with key partners.

Pakistan's anti-dumping charges against India are particularly baffling, as the two duelling neighbours have banned any trade between them.

Yet, Pakistan has initiated an anti-dumping investigation against India over exports of sulfonic acid, which is used in manufacturing detergents, dyes, and catalysts, according to a World Trade Organization report released late on 12 June.

The WTO document details preliminary and final antidumping measures undertaken by 11 members of the trade body, including major economies such as the US, Brazil, Pakistan, Indonesia, and the UK, against various countries. The report is based on notices submitted in May under Article 16.4 of the WTO Anti-Dumping Agreement.

https://www.pressreader.com/india/mint-hyderabad/20250614/282140707339432?srsltid=AfmBOoo0PkhzQa2BAkRx5LFq89MkBkLUR1B0GvlO8qo_q5_AIdnx_3fz

India-EU FTA 'pretty close' to final deal: 'Non-tariff barriers' key issue, says Goyal; both sides actively working to resolve it

The Times of India | 13 June 2025

Union commerce minister Piyush Goyal, during his three-day official visit to Sweden, said India and the European Union are "pretty close" to finalising the long-awaited Free Trade Agreement (FTA). He added that the only major issue left to be resolved between the two is "non-tariff barriers."

"We are very much on track to achieve that (FTA). Significant progress has been made. More than half the chapters are ready. In terms of content, I would say we are almost 90 per cent ready for market access. The important issues to be addressed are non-tariff barriers and how we will make it smoother, easier, and better to do business between the EU and India," Goyal told reporters.

He added that India and the EU are actively discussing ways to make business easier for companies on both sides.

Addressing "non-tariff barriers" is crucial for the proposed Free Trade Agreement (FTA), and both sides are working together to resolve these issues, he noted.

Countries establish non-tariff measures (NTMs) as domestic regulations to safeguard human, animal, plant health and environment. These comprise technical measures including regulations, standards, testing, certification, pre-shipment inspection, and non-technical measures such as quotas, import licensing, subsidies, and government procurement restrictions.

NTMs transform into non-tariff barriers (NTBs) when they become arbitrary and exceed scientific justification, creating trade obstacles.

Indian exports remain significantly under potential due to NTBs in various regions, including the EU, US, China, Japan, and Korea.

On the Carbon Border Adjustment Mechanism (CBAM), Commerce Minister Piyush Goyal said it acts as a non-tariff barrier and is "not good" for India. He warned that imposing such a carbon tax would be unfair to Indian industries and that India would have to respond if the EU goes ahead with it.

Earlier on February 28, Prime Minister Narendra Modi and European Commission President Ursula von der Leyen agreed to finalise a long-pending free trade agreement (FTA) by the end of this year, as concerns grow over US President Donald Trump's tariff policies.

India and the 27-member EU bloc resumed FTA negotiations in June 2022 after an eight-year pause. In 2024–25, bilateral trade in goods between India and the EU reached $136.4 billion, with Indian exports at $75.75 billion and imports at $60.65 billion—making the EU India's largest trading partner for goods.

The EU accounts for about 17% of India's total exports, while India makes up 9% of the EU's global exports. European companies have invested over $117 billion in India, with around 6,000 firms operating in the country. Meanwhile, Indian investments in the EU are estimated at $40 billion.

https://timesofindia.indiatimes.com/business/india-business/india-eu-fta-pretty-close-to-final-deal-non-tariff-barriers-key-issue-says-goyal-both-sides-actively-working-to-resolve-it/articleshow/121793362.cms

Challenging times for global trade; India will certainly cross USD 825 bn exports this fiscal: Goyal

The Print | 11 June 2025

The world trade is facing severe geo-political challenges, but India has consistently emerged as a winner in such times, and the country's exports of goods and services will certainly cross USD 825 billion in 2025-26, Commerce and Industry Minister Piyush Goyal said.

Despite global economic uncertainties due to the Russia-Ukraine conflict, Israel-Hamas war and the Red Sea crisis, the country's overall exports touched an all-time high of USD 825 billion against USD 778 billion in 2023-24.

As per estimates of certain multi-lateral bodies, there would be a contraction in global trade, Goyal said.

"The world is going through severe geo-political challenges…So these are challenging times, but India has always emerged (as) a winner in challenging times and we did a record USD 825 billion exports in 2024-25. This year, we hope to do much better," he told PTI.

When asked if last fiscal's figures will be crossed, he said: "We will certainly be able to cross that".

Apex exporters' body FIEO has projected that the country's overall goods and services exports are expected to grow by over 21 per cent year-on-year to USD 1 trillion during 2025-26.

In 2025-26, merchandise exports are expected to grow 12 per cent to USD 525-535 billion from USD 437 billion in 2024-25, while services exports are likely to rise by about 20 per cent year-on-year to USD 465-475 billion from USD 387 billion in the last fiscal, according to FIEO.

The major sectors that are expected to show a significant jump in the shipments this fiscal include electronics, engineering, chemicals, textile and clothing, pharma and even the agriculture sector.

Free trade agreements with countries such as the UAE, Australia and European Free Trade Association (EFTA) will also help boost exports in the coming months.

The India-EFTA trade agreement is expected to come into force from October 1 this year.

https://theprint.in/economy/challenging-times-for-global-trade-india-will-certainly-cross-usd-825-bn-exports-this-fiscal-goyal/2653886/

EU seeks easier quality control certification under trade deal

Financial Express | 11 June 2025

The European Union (EU) has sought easier certification process under India's Quality Control Orders (QCOs) during negotiations on a free trade agreement (FTA).

The issue of QCOs was discussed in depth for the first time during the 11th round of negotiations here last month. While no text-based discussions were held, the Indian side clarified on some procedural aspects and some areas where improvement could be considered, officials said.

To ease the process of certification under QCOs, online application and accreditation of EU Conformity Assessment Bodies (CABs) could be considered by India.

Since the introduction of the Bureau of Indian Standards Act in 2017, more than 187 QCOs covering 769 products have been notified for compulsory certification of BIS by various regulators and ministries. The products covered by the QCOs must have BIS certification if they have to be sold in India. It applies equally to domestic producers and importers. Apart from the products, the manufacturing facilities also have to undergo certification.

In the 11th round of talks, five chapters out of the 23 chapters or policy areas were concluded. These included chapters on transparency, good regulatory practices, customs and trade facilitation and intellectual property rights, as well as mutual administrative assistance provisions. Except for one pending issue, agreement on the text of dispute settlement chapter was reached. On the intellectual property rights, detailed discussions during the round focused on general provisions, copyright, protection of undisclosed information, enforcement of intellectual property rights, including border measures and cooperation.

https://www.financialexpress.com/policy/economy-eu-seeks-easier-quality-control-certification-under-trade-deal-3876522/

World Bank Projects India's FY26 Growth at 6.3%

News on AIR | 11 June 2025

The World Bank has pegged India's economic growth projection at 6.3 per cent for the Financial Year 2025-26, stating that the country is projected to maintain the fastest growth rate among the world's largest economies.

According to the World Bank's latest Global Economic Prospects report, India's growth moderated in FY 2024-25 due to deceleration in industrial output growth. However, growth in construction and services activity remained steady, and agricultural output recovered from severe drought conditions, supported by resilient demand in rural areas.

The report stated that in FY 2026-27 and FY 2027-28, growth is expected to recover to 6.6 per cent a year, on average. This would be partly supported by robust services activity, contributing to a pickup in exports.

The report highlighted that height-

ened trade tensions and policy uncertainty are expected to drive global growth down this year to its slowest pace since 2008, outside of outright global recessions. The global growth has been projected to slow to 2.3 per cent in 2025, nearly half a percentage point lower than the rate that had been expected at the start of the year.

https://www.newsonair.gov.in/world-bank-projects-indias-fy26-growth-at-6-3/

EU FTA in a month or two: Piyush Goyal

Financial Express | 10 June 2025

Commerce and industry minister Piyush Goyal said on Tuesday that a free trade agreement (FTA) with the European Union (EU) could be sealed in a month or two, and the pact, coupled with other similar engagements, will insulate India from the geopolitical changes happening in the rest of the world.

"I am not very concerned about what is happening in the world. I believe it will open up new vistas of opportunities for India," the minister said at the 18th Swissmem Industry Day event in Bern, Switzerland.

India and the EU have been negotiating the FTA since 2022. India inked an FTA with the UK last month and signed a similar pact with the four-member European Free Trade Association (EFTA) last year. With the EU trade deal India would secure preferential access for its exports to the whole of Europe.

The minister also said India is having robust discussions with the US for a bilateral trade agreement (BTA). As the minister spoke, a US delegation led by the assistant US trade representative was wrapping up seven-day negotiations on the interim tranche of the BTA in New Delhi.

Citing India's trade agreements with Australia and some West Asian countries as well as ongoing negotiations with New Zealand, Peru and Chile, the minister said, "India is today coming out of the shadows. In this situation any turbulence in the rest of the world will hurt India less than it will hurt the rest of the world because we have a big runway of growth ahead of us."

https://www.financialexpress.com/policy/economy-eu-fta-in-a-month-or-two-piyush-goyal-3874187/

India Inc to double capex to $850 billion in 5 years, says S&P report

Business Standard | 10 June 2025

Corporate India is embarking on an ambitious investment drive, with capital expenditure (capex) expected to double to $850 billion over the next five years, according to a report by S&P Global Ratings. Indian power & transmission, airlines, and green hydrogen sectors would spearhead the spending spree, the report said.

Driven by strong balance sheets, robust operating cash flows, and favourable government policy, Indian companies are aiming to scale up operations in what could be a defining expansion phase. The top-100 listed companies, with a combined revenue of $1 trillion and $150 billion in Ebitda (earnings before interest, taxes, depreciation, and amortisation) in 2024-25 (FY25), were expected to fund most of the investment internally, keeping leverage in check, the report said. Unlisted renewable energy and airline companies with large capex plans were also taken into consideration by the firm to prepare the report.

"Companies are investing to capture growth, supported by macro tailwinds and deeper domestic funding markets," S&P analysts wrote, adding: "Execution will be key to avoiding balance sheet slippage."

The power & transmission sector would account for roughly $300 billion in new investment — more than a third of the total projected capex. Renewable energy projects and grid infrastructure are expected to dominate the agenda as India pursues its 500 Gw (gigawatt) renewable capacity target by 2030. NTPC Ltd, Tata Power, and Power Grid Corp are set to lead the charge. The Adani group has already announced $20 billion annual capex in the next five years while the Tata group is planning to invest $120 billion, mainly in airlines, semiconductors and electronic sectors.

While debt levels in the power sector are likely to rise — NTPC and Tata Power could see debt-to-Ebitda ratios increase by about 1x — S&P said the credit profiles of major players remained within tolerable limits.

Airlines were another major investment engine, the report said.

Traditional sectors like steel, cement, oil & gas, and auto are projected to contribute $250 billion in cumulative capex. Steel and cement alone were ramping up capacity by 25 million tonnes (mt) and 35 per cent, respectively, though their investment would be more gradual and reliant on internal accruals, the report said.

Emerging sectors such as green hydrogen, semiconductors, and battery plants were poised to attract $50 billion-$100 billion in investment, led by giants like the Adani group and Tata Electronics. However, funding needs for these high-capex sectors would likely require more external debt.

"India's corporate capex boom is a calculated bet on long-term competitiveness and scale… If executed well, it could mark a structural step-up in the country's industrial capacity," S&P concluded.

https://www.business-standard.com/economy/news/india-inc-to-double-capex-to-850-billion-over-the-next-five-years-125061000881_1.html

'New base year for GDP, CPI, IIP from early 2026; Services survey from Jan'

The Indian Express | 09 June 2025

With the Ministry of Statistics and programme implementation (MOSPI) undertaking a base revision exercise and expansion of its data indicators, the key economic datasets — GDP, IIP and CPI — will see a new base from next year onwards, MOSPI Secretary Saurabh Garg said. Garg also said that the weights and items for the new retail inflation basket will now be linked with Household Consumption and Expenditure Survey (HCES) 2023-24 instead of the earlier decision to derive it from HCES 2022-23.

https://www.pressreader.com/india/the-indian-express/20250609/282153592230698?srsltid=AfmBOooGVQvKhF_dC9fzOBTDTFbouBiIE5iWfi8Gyn-fCOfUav4dQ7g5i

Eye on strong export advantage, India not keen to dent Turkey trade ties with curbs

The Indian Express | 09 June 2025

Amid moves to curb the role of Turkish companies in critical infrastructure, citing national security grounds, there is palpably less appetite within the Government to extend this approach to the bilateral trade basket despite calls from industry groups to ban the import of items such as apples and marbles. Reason: India runs a $2.73 billion bilateral goods trade surplus and any blockade could be counter-productive.

"We have received a number of representations to ban imports from Turkey. Apple-growers from Himachal Pradesh have sought a ban on apple imports from Turkey. But India runs a trade surplus with Turkey and we have to keep in mind our exporters' interests too. It (a trade ban) could be a strong geopolitical message, but it's about how far you want to take it," a Government official told The Indian Express.

The trade surplus assumes significance as India's outbound shipments to Turkey largely consist of industrial exports, such as engineering goods, electronics, and organic and inorganic chemicals, which have increased over the past five years. In contrast, Turkey's exports to India are largely limited to fruits, nuts, gold and marble. Turkey had also stepped up petroleum product imports from India following the Ukraine war but this category has seen a significant decline in FY25.

Official trade data showed that exports to Turkey in FY25 totalled $5.72 billion, largely driven by engineering exports, which comprise over 50 per cent at $3 billion. Notably, the Micro, Small and Medium Enterprises (MSME) sector dominated the segment, contributing nearly 35-40 per cent.

Imports from Turkey during the last financial year stood at $2.99 billion — imports in the fruits and nuts category were $107.12 million, up nearly 10 per cent from $96.82 million the previous financial year. India also imported gold worth $270.83 million from Turkey in FY25 — 159.02 per cent higher than the $104.56 million worth of gold imports in FY24.

https://indianexpress.com/article/business/eye-on-strong-export-advantage-india-not-keen-to-dent-turkey-trade-ties-with-curbs-10055610/

GST returns to become time-barred after 3 years starting July tax period

Business Standard | 07 June 2025

GST Network said beginning the July tax period, GST taxpayers will not be able to file monthly and annual GST returns after three years of the original filing due date.

The July 2025 tax period means taxpayers will file monthly returns in August this year.

In an advisory, the Goods and Services Tax Network (GSTN) said taxpayers will not be able to file GSTR-1, GSTR 3B, GSTR-4, GSTR-5, GSTR-5A, GSTR-6, GSTR 7, GSTR 8 and GSTR 9 on expiry of three years from the filing due date. The amendments to Goods and Services Tax (GST) law with regard to time barring were effected through the Finance Act, 2023.

Thus, GST outward supply returns, besides returns related to payment of the liability, annual returns and tax collected at source will become time-barred.

"The returns will be barred for filing after expiry of three years. The said restriction will be implemented on the GST portal from the July 2025 Tax period," the GSTN advisory said.

It advised taxpayers to reconcile their records and file their GST returns as soon as possible if not filed till now.

Earlier in October, the GST Network (GSTN) alerted taxpayers that the said provision of tax barring would be implemented in early 2025.

AMRG & Associates Senior Partner Rajat Mohan said that while this step enhances system discipline and curtails prolonged non-compliance, it may severely impact taxpayers who, due to litigation, system issues, or genuine oversight, have pending filings.

"The absence of a redressal mechanism for exceptional cases could lead to permanent denial of Input Tax Credit and financial setbacks," Mohan said.

https://www.business-standard.com/finance/news/gst-returns-to-become-time-barred-after-3-years-starting-july-tax-period-125060700318_1.html

India, US discuss tariffs, market access, taxation woes in on-going trade talks

Business Line | 06 June 2025

India is making a case for redressal of US measures hurting Indian industry, such as taxes on steel & aluminium and auto as well as the proposed

taxation on foreign remittances, in the ongoing negotiations for the India-US bilateral trade agreement (BTA).

"While India's insistence on waiver of full 26 per cent reciprocal tariffs slapped on it by US President Donald Trump, which includes 10 per cent baseline tariffs already imposed, remains at the top of its agenda, it is also trying to fix some of the other issues through the talks," a source tracking the matter said.

With the US aiming to bring down its trade deficit of over $40 billion with India by seeking steep tariff cuts in many sectors, such as automobiles, motorcycles, alcoholic beverages and agricultural items, India too is trying to get commitments in labour-intensive sectors such as textiles & garments and leather.

The Trump regime's proposal to impose a impose a 3.5 per cent tax on remittances sent abroad by foreign workers, including green card holders and temporary visa workers, is a move that could hit India as it a top remittance recipient.

"India is likely to take up the issue of the proposed imposition of remittances tax with the US and argue against it as it would adversely affect the economy and professionals working abroad," the source said.

https://www.thehindubusinessline.com/economy/india-us-discuss-tariffs-market-access-taxation-woes-in-ongoing-trade-talks/article69666036.ece

EU FTA pace to beat expectations of leaders: Goyal

Financial Express | 05 June 2025

Negotiators of the India and European Union (EU) Free Trade Agreement (FTA) will beat the expectations of top leaders from both sides and may conclude it before the end of the year. Commerce Minister Piyush Goyal held three meetings with his counterpart Maros Sefcovic on the pact in the last 35 days.

Prime Minister Narendra Modi and European Commission President Ursula von der Leyen had set the deadline of 2025-end for concluding the FTA.

In June 2022, India and the 27-nation EU bloc resumed negotiations for a comprehensive free trade agreement, an investment protection agreement and a pact on Geographical Indications after a gap of over eight years. So far 11 rounds of negotiations on the agreement have been held.

https://www.financialexpress.com/policy/economy/eu-fta-pace-to-beat-expectations-of-leaders-goyal/3870083/

Indian Economy Defies Global Slowdown: OECD

Bizz Buzz News | 04 June 2025

India continues to defy the global slowdown, the OECD's latest 'Economic Outlook' said, projecting the country's economy to grow by 6.3 per cent in 2025 and 6.4 per cent in 2026.

Strong domestic demand, resilient services and manufacturing sectors, and ongoing infrastructure investments have been cited as key drivers for India's strong performance amid global uncertainties. The report also cautioned that external risks — particularly from global trade frictions — could spill over into export-heavy segments.

China, on the other hand, is losing steam. Its growth is projected to moderate from 5.0 per cent in 2024 to 4.7 per cent in 2025 and 4.3 per cent in 2026. The Outlook projects global growth slowing from 3.3 per cent in 2024 to 2.9 per cent in both 2025 and 2026. "The slowdown is expected to be most concentrated in the United States, Canada, Mexico and China, with smaller downward adjustments in other economies," it noted.

https://www.bizzbuzz.news/economy/indian-economy-defies-global-slow-down-oecd-1363945

Chemicals and Petrochemicals

CPCB publishes draft guidelines for solar wastes

Chemical Weekly | 24 June 2025

India is projected to generate over 34,600-tonnes of solar photovoltaic (PV) waste by 2030, according to draft guidelines released by the Central Pollution Control Board (CPCB), which has proposed a detailed framework for handling end-of-life solar modules, panels, and cells.

The draft guidelines titled 'Safe Handling and Disposal of Solar Photovoltaic Modules, Panels, and Cells', released on May 30, 2025, outline roles and responsibilities of manufacturers, bulk consumers, dismantlers, and recyclers under the existing E-Waste (Management) Rules, 2022.

According to the CPCB, India had installed over 73-GW of solar capacity as of March 2023, and the country's cumulative PV waste generation is expected to increase significantly from approximately 100-tonnes in 2020 to 600,000-tonnes by 2040.

"Solar PV waste consists of various materials such as glass, aluminium, silicon, plastics and heavy metals like lead, cadmium and antimony. Improper handling or disposal can pose serious risks to human health and the environment," the guidelines state.

The CPCB has called for public comments on the draft by June 29, 2025. It said that after finalisation, the document will serve as an advisory framework to be adopted by various stakeholders for effective end-of-life management of solar PV systems.

"The guidelines are intended to minimise environmental and health hazards by ensuring the environmen-

tally sound management of end-of-life solar PV equipment in India," CPCB noted.

India Among World's Top Plastic Recyclers, Needs New Data To Correct Global Narrative: DCPC Joint Secretary

Business World | 16 June 2025

India has the potential to become a global leader in plastic recycling, a senior government official said, while calling for a new data-driven study to challenge outdated international reports that have labelled the country as the world's top plastic polluter.

Deepak Mishra, Joint Secretary in the Department of Chemicals and Petrochemicals, said current global assessments fail to reflect India's progress in plastic waste management and recycling practices. He pointed to the importance of accurate, up-to-date data to present a more realistic picture of the country's environmental efforts.

Speaking at a summit organised by the Plastic Packaging Research and Development Centre (PPRDC), Mishra said, "Last year, a global study published in Nature ranked India as the number one contributor to plastic waste. But that was based on outdated datasets and GIS estimates. Today, our plastic recycling rate is closer to 85-90 per cent, a fact acknowledged by international experts as well."

He pointed out that older studies continue to influence public discourse, even though ground realities have significantly changed. "Even if we accept a conservative estimate of 40-60 per cent recycling, India still ranks far ahead of developed economies like the US and EU, which recycle just about 10–20 per cent of their plastic waste," he said.

The official also lauded Indian plastic industry for successfully adapting to the Extended Producer Responsibility (EPR) regime. "When I joined two years ago, there was widespread concern about EPR and compliance burdens. But the industry has taken it in its stride and is now quite optimistic."

Mishra added that many countries export their plastic waste to developing nations, while India has a net negative plastic waste profile and handles a significant share of global recycling. "We need an updated study to present India's true position in global plastic waste management," he said.

Calling for more responsible global narratives, the official concluded, "India's efforts in circular economy, recycling and regulatory reform deserve acknowledgement. We are only halfway through, but we are on the right path."

https://www.businessworld.in/article/india-among-worlds-top-plastic-recyclers-needs-new-data-to-correct-global-narrative-dcpc-joint-secretary-560103

India set to attract Rs. 8,000+ crore investments for energy storage, EV, and green hydrogen at IESW 2025

Indian Chemical News | 07 June 2025

The 11th edition of the most anticipated and premier energy storage and advanced battery event in India, India Energy Storage Week (IESW) 2025, is scheduled to take place in New Delhi from July 8 to 10.

Hosted by the leading industry body, India Energy Storage Alliance (IESA), the event aims to bolster the Indian government's mission of becoming a global manufacturing hub by serving as a launchpad for various factory and gigafactory announcements. IESA projects, India is set to attract over Rs. 8,000 crore in investments for energy storage, EV (electric vehicle), and green hydrogen at IESW 2025, driven by the facilitation of new business deals, collaborations, foreign investments, and the signing of Memorandums of Understanding (MoUs). IESW will feature international delegates from Australia, Germany, France, the UK, Finland, Canada, the USA, Israel, and Korea.

IESA is also collaborating with Gujarat, Odisha, Telangana, and Chhattisgarh as state partners. Various ministries will support the event contributing in this endeavour promoting a robust manufacturing ecosystem.

As per the recent data revealed by the Government of India in 2023, over 6,600 cleantech startups are operating across 450 districts throughout India, spread over nearly 34 states and Union Territories. With this, it can be anticipated that the Indian battery and mobility startup ecosystem is going to experience robust growth in the coming years. Recently, IESA has also projected that the Indian mobility and battery startups will attract an investment of USD 500 million within a year, driving innovation and advancements in the sector.

Over 150 key partners, exhibitors, and more than 1,000 companies will participate in IESW 2025 at Yashobhoomi Convention and Expo Centre in New Delhi

India's PVC resin market set to grow by 8 pc to reach 5.5 MMT by FY27

The Hawk | 06 June 2025

Demand for polyvinyl chloride (PVC) resin in India is expected to grow by 8 per cent per annum to reach 5.5 million metric tonnes (MMT) by FY27, a report said on Thursday.

Demand for PVC resin witnessed a healthy growth at a CAGR of 6.2 per cent during FY20-FY25, reaching 4.7 million metric tonnes (MMT) last fiscal.

This was achieved on the back of strong demand from end-user industries supported by favourable government policies, said the report by CareEdge Ratings.

Out of India's total demand for PVC, 95 per cent pertains to suspension PVC resin, and the balance 5 per cent pertains to paste PVC resin.

"The upcoming addition of 2.5 MMT domestic capacity by FY27 is expected to more than double the current production levels, reducing import reliance to an average of 1.4 MMT -- reduction in imports from 62 per cent in FY25 to 30 per cent of overall domestic consumption in FY27," said Rohan Deshmukh, Assistant Director at CareEdge Ratings.

https://www.thehawk.in/news/economy-and-business/indias-pvc-resin-market-set-to-grow-by-8-pc-to-reach-55-mmt-by-fy27

Members' News

DCM Shriram buying Hindusthan Specialty Chemicals for Rs. 375-crore

Chemical Weekly | 24 June 2025

DCM Shriram Ltd., the diversified conglomerate with leading positions in the chlor-alkali industry, has said that its Board of Directors has approved the acquisition of a 100% equity stake in Hindusthan Speciality Chemicals Ltd. (HSCL) for Rs. 375-crore.

HSCL, an unlisted subsidiary of Hindusthan Urban Infrastructure Ltd. (HURL) is headquartered in Bharuch, Gujarat, and operates in the epoxy and advanced materials segment. The company is engaged in the manufacturing and distribution of solid and liquid epoxy resins, reactive diluents, formulated epoxy resins and curing agents.

This deal marks the entry of the chemicals business of DCM Shriram into the epoxy and advanced materials space, as a downstream integration of epichlorohydrin (ECH), thereby unlocking synergies with its existing chemicals portfolio, DCM Shriram said in a press note. It added that the move aligns with its strategic objective to expand into speciality chemicals.

Adani commissions India's first off-grid green hydrogen pilot plant of 5 MW capacity

Indian Chemical News | 23 June 2025

Adani New Industries Limited (ANIL) today announced the successful commissioning of India's first off-grid 5 MW Green Hydrogen Pilot Plant in Kutch, Gujarat, marking a major milestone in the nation's clean energy transition.

The state-of-the-art plant is 100% green-powered by solar energy and integrated with a Battery Energy Storage System (BESS), enabling it to operate completely off-grid. This represents a new paradigm in decentralized, renewable-powered hydrogen production. The ANIL pilot plant is India's first off-grid 5 MW green hydrogen facility featuring a fully automated, closed-loop electrolyzer system designed to respond dynamically to real-time renewable energy inputs. This provides valuable operational flexibility, particularly in addressing the variability of solar power, while ensuring efficiency, safety and performance.

Epigral to double wind-solar hybrid power plant capacity

Chemical Weekly | 17 June 2025

Speciality chemical maker Epigral Ltd. said it will more than double its wind-solar hybrid power capacity to 38.14-MW from 18.34-MW through a Rs. 21.38-crore investment.

The company will invest Rs. 21.38-crore for a 26% stake in a Special Purpose Vehicle (SPV) created in partnership with Prozeal Green Energy Ltd to add 19.80-MW renewable capacity.

The strategic partnership will be formalised for 25 years through an energy subscription agreement and share subscription and shareholder agreement between the two companies, Epigral said in a statement.

The capacity expansion is expected to be commissioned by the fourth quarter of FY26 and will help meet rising power demands from upcoming projects, the company said.

"The capacity expansion will be important to meet our rising energy demands," Epigral's Chairman and Managing Director, Mr. Maulik Patel said.

Epigral has announced plans to expand capacity for CPVC resin to 150-ktpa and epichlorohydrin to 100-ktpa. The company recently commissioned a chlorotoluene value chain plant at its Dahej facility in Gujarat.

The renewable energy expansion reflects the company's strategy to secure clean power while pursuing aggressive growth in the specialty chemicals sector.

Afcons bags LoA for RIL's vinyl projects at Dahej

Indian Chemical News | 09 June 2025

Afcons Infrastructure Limited has been awarded a Letter of Award (LoA) from Reliance Industries Limited (RIL) for the execution of construction works related to the vinyl projects at Dahej, Gujarat. The order is for construction works for vinyl projects of RIL at Dahej, Gujarat. The scope of work includes civil, mechanical and associated works with installation, testing and commissioning works. The contract value of Rs. 700 crore (excluding GST) is an indicative value and the payment shall be made as per the actual value of the work executed as per the contract.

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NOTIFICATIONS

1. Issued by MOEF&CC, GoI- Plastic Waste Management (Second Amendment) Rules, 2025 – 03/06/2025
   https://egazette.gov.in/WriteReadData/2025/263615.pdf

2. Issued by DPIIT, Ministry of Commerce and Industry, GoI - Framing of Rules/Regulations under Copyright Rules, 2013 seeking comments of General Public – 04/06/2025
   https://spicyip.com/wp-content/uploads/2025/06/Copyright-amendment-proposal-2025.pdf

3. Issued by DPIIT, Ministry of Commerce and Industry, GoI - Static and Mobile Pressure Vessels (Unfired) (Amendment) Rules, 2025 – 05/06/2025
   https://avantiscdnprodstorage.blob.core.windows.net/legalupdatedocs/43428/Static-and-Mobile-Pressure-Vessels-Unfired-Amendment-Rules-2025-JUNE112025.pdf

4. Issued by DGTR, Ministry of Commerce and Industry, GoI – AD investigation concerning imports of Soda Ash originating in or exported from Turkey, Russia, USA and Iran
   (a) Postponed OH – 06/06/2025
   https://dgtr.gov.in/sites/default/files/2025-06/Soda%20OH%20Postponed.docx%20%281%29.pdf
   (b) Rescheduled OH – 18/06/2025
   https://dgtr.gov.in/sites/default/files/2025-06/Rescheduled%20OH%20%288%29.pdf

5. Issued by DGTR, Ministry of Commerce and Industry, GoI – AD investigation concerning imports of 'PVC Suspension Resins' originating in or exported from China PR, Indonesia, Japan, Korea RP, Taiwan, Thailand and USA - Preponed OH- 06/06/2025
   https://dgtr.gov.in/sites/default/files/2025-06/PVC%20Preponed%20OH%20%281%29.pdf

6. Issued by DPIIT, Ministry of Commerce and Industry, GoI - Gas Cylinders Amendment Rules 2025 – 09/06/2025
   https://www.legalitysimplified.com/wp-content/uploads/2025/06/Gas-Cylinders-Amendment-Rules-2025-JUNE182025-1.pdf

7. Issued by DGTR, Ministry of Commerce and Industry, GoI – AD investigation concerning imports of "PVC Paste Resin" originating in or exported from European Union and Japan - Extension of timeline to file Questionnaire Responses - 11/06/2025
   https://dgtr.gov.in/sites/default/files/2025-06/Extension%20to%20file%20Questionnaire%20Responses%20Circular.pdf

8. Issued by DGFT, Ministry of Commerce and Industry, GoI - Rollout of 'Source from India' on Trade Connect ePlatform for all Status Holders– 13/06/2025
   https://files.capexil.org/2025/06/Source-from-India-DGFT.pdf

9. Issued by MNRE GoI - Call for Proposals on Innovation Challenge for Circularity in Renewable Energy Technologies - Batteries and Solar Photovoltaic– 16/06/2025
   https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2025/06/20250616466820912.pdf

10. Issued by DPIIT, Ministry of Commerce and Industry, GoI - Draft Rules under the Boilers Act, 2025- Inviting Objections/ Suggestions– 19/06/2025
    https://dpiit.gov.in/whats-new/draft-rules-under-boilers-act-2025-inviting-objectionssuggestions

11. Issued by Department of Revenue, Ministry of Finance, GoI - Use of ICETABs for efficient export examination and clearance – 19/06/2025
    https://taxinformation.cbic.gov.in/view-pdf/1003282/ENG/Circulars

12. Issued by DCPC, Ministry of Chemicals and Fertilizers, GoI- Quality Control Order for Poly Vinyl Chloride PVC Homopolymers Amendment regarding. – 20/06/2025
    https://chemicals.gov.in/sites/default/files/notification/Gazette-Notification-of-POLY-QCO-ORDER-2025_0.pdf

13. Issued by DGFT, Ministry of Commerce and Industry, GoI - Amendment in Para 2.03(A) (i) (g) of the Foreign Trade Policy, 2023 laying down enabling provisions for import of inputs, that are subjected to mandatory Quality Control Orders (QCOs), by Advance Authorisation holders, EOU and SEZ. – 23/06/2025
    https://www.caalley.com/dgft25/noti20.pdf

14. Issued by DPIIT, Ministry of Commerce and Industry, GoI - Static and Mobile Pressure Vessels (Unfired) (Amendment) Rules, 2025 – 25/06/2025
    https://www.legalitysimplified.com/wp-content/uploads/2025/06/Static-and-Mobile-Pressure-Vessels-Unfired-Amendment-Rules-2025.pdf

15. Issued by DGFT, Ministry of Commerce and Industry, GoI - Extension in Minimum Import Price (MIP) Condition on Soda Ash covered under Chapter 28 of ITC (HS) 2022, Schedule-I(Import Policy)-reg.– 30/06/2025
    https://a2ztaxcorp.net/wp-content/uploads/2025/07/Adobe-Scan-30-Jun-2025.pdf

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2025 China International Chlor-Alkali Conference (13th)

Nov. 12-14th, Xi'an, Shaanxi province, China

Partner: AMAI

As the global technology and new energy industries are gathering pace in 2025, green and low-carbon transformation has become a prevailing trend. This not only brings challenges to the chlor-alkali industry but also creates new development opportunities. The industry is at a crucial juncture of innovation and transformation, with intelligent development, optimization of green processes and expansion of the new energy sector becoming new drivers for growth in the industry. Against this backdrop, what are the unique advantages and development strategies of the chlor-alkali industry in key regions around the world? How do we seize technological innovation to jumpstart industrial upgrading? How can we gain the upper hand in the green transformation and achieve sustainable development? And how will the emerging downstream sectors reshape the market landscape? This conference will provide profound insights into these important issues, pooling wisdom and strength for the high-quality development of the global chlor-alkali industry.

2025 China International Chlor-Alkali Conference (13th) is scheduled to be held in Xi'an from November 12-14, 2025.

Conference Topics

1.Development Pattern and Future Trend of the Vinyl Industry in North America
2.Development Status and Prospect of the Chlor-Alkali Industry in North America
3.The Latest Development Strategy of the Chlor-Alkali Industry in Europe
4.Development Status and Prospect of the Vinyl Industry in Europe
5.Analysis of the Latest Development of the Global Vinyl Industry Chain
6.Analysis of the Global Caustic Soda Trade Flow and Future Trend
7.Evolution and Prospect of the Global PVC Market Pattern
8.Analysis of the Impact of the Global Alumina Industry on the Caustic Soda Industry
9.Evolution and Development Trend of the Global Raw Salt Market Supply-Demand Pattern
10.Current Situation of the Supply-Demand Pattern and Future Development Blueprint of the Chlor-Alkali Industry in South America
11.Trend and Outlook of the Caustic Soda Industry in India
12.Analysis of Indian PVC Market Trend and Insights into the Future Development Path
13.Progress of the Circular Economy in the Vinyl Industry in the ASEAN Region
14.Analysis of the Development Dynamics and Future Growth Potential of the Caustic Soda Market in the ASEAN Region
15.Current Development Status and Future Trend of the Vinyl Industry in Japan
16.Development Path and Trend Changes of the Chlor-alkali Industry in South Africa
17.Analysis of Investment Opportunities in Chlor-alkali Projects in Indonesia
18.Analysis of the Economic Operation of the Chlor-alkali Industry in China
19.Current Development Status of the Caustic Soda Market and the Industrial Development Dynamics in China
20.Analysis of the PVC Supply and Demand Pattern in China and Outlook on the Trends
21.Supply-Demand Dynamics and Future Prospects of China's Key Chlorine - Consuming Products
22.The Path of Energy Conservation and Carbon Reduction, Green Development, Technological Innovation and Intelligent Development in the Chlor-alkali Industry

Registration date: November 12th, 2025
Meeting time: full day on November 13th, 2025 and half day on the morning of November 14th, 2025
Meeting location: Xi'an International Convention Center Hotel
Conference fee: $1200 per person (excluding accommodation)
Early bird offers
$1100/person, until August 12th
Accommodation fee: ¥ 600/room/day for a king/standard room

Please contact
Lily Wang Tel: 86 - 13501310062 Email: lilywang@ccaon.com

KEY INDICATORS MAY 2025

1 Alkali Imports (MT)

	Qty (May 2025)	Qty (May 2024)	% Difference (Y-o-Y)	Qty (Apr 2025)	% Difference (M-o-M)	FY 2025-26 (upto May)	FY 2024-25 (upto May)	% Difference	Total Imports 2024-25
Caustic Soda	566	20,096	-97.2%	917	-38.2%	1,483	31,289	-95.3%	1,64,881
Soda Ash	1,01,877	81,948	24.3%	1,04,400	-2.4%	2,06,277	1,71,349	20.4%	10,74,639
Sodium Bicarbonate	2,772	3,525	-21.4%	4,683	-40.8%	7,455	9,690	-23.1%	45,874

Average Price in May 2025: Caustic Soda - 533 USD/MT(Flakes) & 428 USD/MT(Lye); Soda Ash - 238 USD/MT; Sodium Bicarbonate - 334 USD/MT

1.2 Alkali Exports (MT)

	Qty (May 2025)	Qty (May 2024)	% Difference (Y-o-Y)
Caustic Soda	49,688	43,562	14.1%
Soda Ash	17,704	51,444	-65.6%
Sodium Bicarbonate	2,984	2,536	17.7%

2 Foreign Trade - Merchandise (US$ billion)

	May 2025	May 2024	% Difference	FY 2025-26 (upto May)	FY 2024-25 (upto May)	% Difference	Total Trade 2024-25
Imports	60.6	61.7	-1.7%	125.5	116.2	8.1%	720.2
Exports	38.7	39.6	-2.2%	77.2	74.9	3.1%	437.4
Surplus/Deficit	-21.9	-22.1		-48.3	-41.3		-282.8

Average Price in May 2025: Caustic Soda - 538 USD/MT(Flakes), 633 USD/MT(Solids) & 439 USD/MT(Lye); Soda Ash - 288 USD/MT; Sodium Bicarbonate - 270 USD/MT

3 Exchange Rate (Rs./USD)

May 2025	Apr 2025	Mar 2025
85.19	85.56	86.64

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

May 2025	May 2024	% Difference
156.6	154.7	1.2%

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

May 2025	May 2024	% Difference
169.4	168.2	0.7%

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

	May 2025	May 2024	% Difference
Mining	136.3	136.5	-0.1%
Manufacturing	154.3	150.4	2.6%
Electricity	216.0	229.3	-5.8%

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

	May 2025	May 2024	% Difference
Chemical & Chemical Products	133.2	126.8	5.0%
Textiles	104.1	107.0	-2.7%
Paper & Paper Products	77.7	81.0	-4.1%
Basic Metals	240.3	225.9	6.4%

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

	May 2025	May 2024	% Difference
India	NA	132.0	-
Russia	NA	NA	-
Brazil	99.0	96.4	2.7%
European Union (27)	109.9	106.5	3.2%
USA	99.7	99.3	0.4%

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

May 2025	May 2024	% Difference
193.0	187.7	2.8%

10 Consumer Price Inflation - Industrial Workers (Base: 2016=100)

May 2025	May 2024	% Difference
144.0	139.9	2.9%

11 Foreign Investment Inflows (US$ Million)

	May 2025	Apr 2025	% Difference
Net Foreign Direct Investment	35	3,859	-99.1%
Net Portfolio Investment	1,554	-3,097	-
Total	1,589	762	108.5%

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

May 2025	Apr 2025	Mar 2025
60	297	307

13 Foreign Exchange Reserves (US$ billion)

May 2025 (as on 30 May 2025)	Apr 2025 (as on 25 Apr 2025)	% Difference
691	688	0.5%

14 Fiscal Deficit (Apr 2025-May 2025)

% of Actuals to Budget Estimates FY 2025-26	% of Actuals to Budget Estimates FY 2024-25
0.8%	3.1%

15 Purchasing Managers Index (PMI)

May 2025	Apr 2025	Mar 2025
57.6	58.2	58.1

Index over 50 shows expansion, while below 50 means contraction

Data Source: GOI, OECD, S&P Global & AMAI Research

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