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New Delhi**

BACKGROUND NOTE

on

“Demand and Availability of Petrochemicals including Imports and Exports”

(For the use of the Standing Committee of Chemicals & Fertilisers)

September 2020

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Introduction

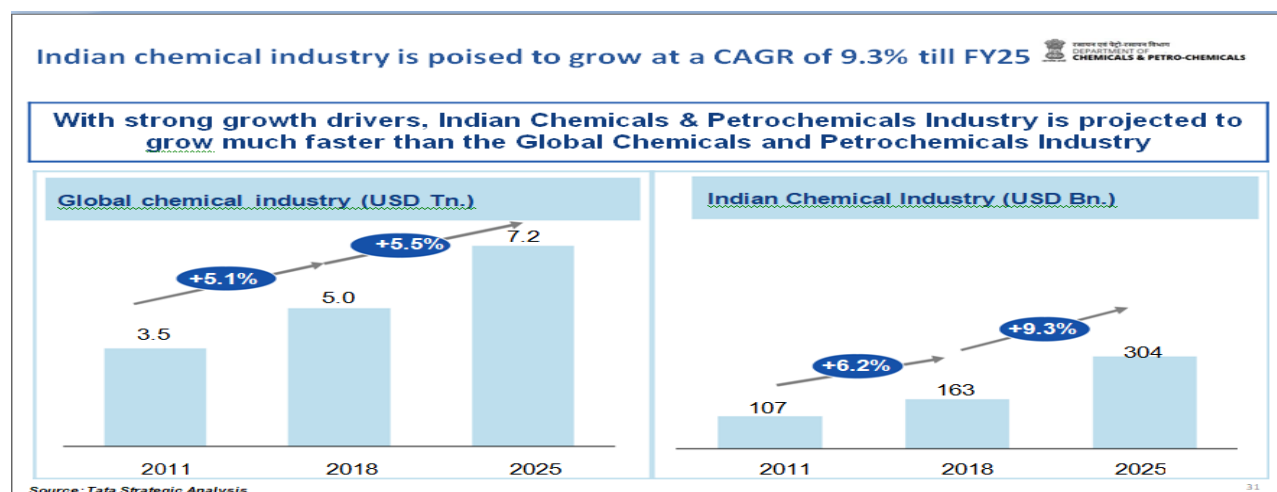
The petrochemical industry in India has been one of the fastest growing industries in the country. Since the beginning, the Indian petrochemical industry has shown an enviable growth rate. This industry also contributes largely to the economy of the country and the growth and development of manufacturing industry as well. It provides the foundation for manufacturing industries like construction, packaging, Pharmaceuticals, agriculture, textiles, etc. The chemical industry is a knowledge intensive as well as capital intensive industry. It is an integral constituent of the growing Indian Industry. It includes basic chemicals and its products, petrochemicals, fertilizers, paints, varnishes, gases, soaps, perfumes and toiletry and pharmaceuticals. The diversification within the chemical industry is large and covers more than eighty thousand commercial products. This Industry occupies a pivotal position in meeting basic needs and improving quality of life. The industry is the mainstay of industrial and agricultural development of the country and provides building blocks for several downstream industries, such as textiles, papers, paints, varnishes, soaps, detergents, pharmaceuticals, etc. Chemicals industry in India is highly diversified, covering more than 80,000 commercial products. It is broadly classified into Bulk chemicals, Specialty chemicals, Agrochemicals, Petrochemicals, Polymers and Fertilizers. India is a strong global dye supplier, accounting for approximately 16% of the world production of dyestuff and dye intermediates. Chemicals industry in India has been de-licensed except for few hazardous chemicals. Upcoming Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIRs) and Plastic parks will provide state-of-the-art infrastructure for Chemicals and Petrochemicals sector. The Indian chemicals industry is projected to reach \$304 bn by 2025. India ranks 14th in export and 8th in import of chemicals (Excluding Pharmaceuticals products) globally. Demand of chemical products is expected to grow at approximately 9% p.a. over the next 5 years. Indian chemical industry employs more than 2 million people and 100% FDI is allowed under the automatic route in the chemicals sector (except in the case of certain hazardous chemicals).¹

India and its future in Petrochemical Industry

Indian chemicals industry ranks 6th in the world and 4th in Asia. India ranks 14th in the world export of chemicals and 10th in the world import of chemicals. The share of export and import of chemicals & petrochemicals is 11.2% and 10.6% in the total national exports and imports in 2017-18. India's GDP stood at US\$2.7 trillion during 2018. With annual envisaged growth rate 7%, India's GDP is assessed to reach US\$ 5 Trillion by 2025 and our economy is expected to be among the 5th largest amongst world's economies by 2025.

As India remains one of the most attractive investment regions for foreign companies with a consistent investment of more than USD 40 Billion for the last three years, the Government of India envisages the development of Global Scale Industrial Corridors in the Petroleum, Chemical and Petrochemical sectors of the country in an integrated and environment friendly manner. In 2018 the size of the sector was US\$ 163 Billion, with import of US\$ 45 Billion. With high population base, there is enormous domestic demand of chemicals & petrochemicals in the country, which is served by domestic manufacturing units as well as by importing from overseas countries.

¹ <https://www.investindia.gov.in/sector/chemicals>



Source: Tata Strategic analysis (Ministry of Chemicals & Fertilisers)

So, with strong domestic demand, the Indian Chemicals and Petrochemicals market is projected to grow at 9.3% p.a. To meet this demand by domestic production, fresh investments of the order of US\$ 200 Billion will be required, mostly in mega projects.² The petrochemicals sector in India provides a direct investment opportunity of over \$30 billion which will cascade into downstream sectors adding about 150 basis points to Gross Domestic Product (GDP) and generating more than 100,000 jobs over the next decade. Also, India will drive over 10 per cent of the world's growth in petrochemicals over this period and will need to set up one cracker every year until 2035 to meet domestic demand.³

Nature of the Indian Petrochemical Industry⁴

The Indian petrochemical industry is a highly concentrated one and is oligopolistic in nature. Four major companies viz. Reliance Industries Ltd (RIL), Indian Petrochemicals Corporation Ltd. (IPCL), Gas Authority of India Ltd. (GAIL) and Haldia Petrochemicals Ltd. (HPL) used to dominate the industry to a large extent. The recent amalgamation of IPCL with RIL has made the industry more concentrated further, as they jointly account for over 70% of country's total petrochemical capacity. However, the scene is a bit different for the downstream petrochemical sector, which is highly fragmented in nature with over 40 companies existing in the market. The Petrochemical Industry in India is a cyclical industry. This industry, not only in India but also across the world, is dominated by volatile feedstock prices and sulky demand. India has one of the lowest per capita consumptions of petrochemical products in the world. For example, the per capita consumption of polyester in India lies at 1.4 kg only comparing to 6.6 kg for China and 3.3 kg for the whole world. Similarly, the per capita consumption of polymers is 4 kg in India, whereas the per capita consumption is around 20 kg for the whole world.

The Indian Chemical & Petrochemicals Industry, with highly diversified chemicals, is currently worth \$150 billion. Contributing to 15% of India's manufacturing GDP, the industry is critical to the country's economic development and has a potential to grow to \$226 billion by 2020. Being an inherent part of sectors such as automobile,

² <https://www.cgijoburg.gov.in/summit-on-global-chemical-petrochemicals.php>

³ <https://energy.economictimes.indiatimes.com/news/oil-and-gas/jobs-indias-petrochemicals-sector-to-provide-100000-jobs-over-next-decade/77590345>

⁴ <https://business.mapsofindia.com/petrochemical/>

pharmaceuticals, textiles and manufacturing, the Chemical Industry is adapting sustainable practices to meet international quality standards as well as support related sectors to innovate and grow accordingly. With initiatives like “Make in India”, reforming labor laws, easing the land acquisition rules and GST, India is at the brink of becoming a manufacturing hub for the world. Globalization has led supply chains for the businesses more complex; therefore, the joint initiative of ‘Together for Sustainability’ (TfS) by global chemical companies has been introduced to encourage Indian chemical manufacturers and suppliers to implement sustainability practices in their management and manufacturing systems. The aim of this initiative is to establish benchmarks that will create a sustainable supply chain. The member companies of TfS, have assigned their resources into building up a worldwide program to audit and evaluate suppliers under pre-defined criteria regarding management, environment, health and safety, labour and human rights, and governance issues. India being a diverse manufacturing base for the Chemical Industry, has immense potential to become a global supplier. Therefore, a sustainable supply chain for the sector has become vital. After the launch for TfS, many Indian companies, doing business globally, have shown interest to join it.⁵

The Petrochemical industry, which entered in the Indian industrial scene in 1970s, registered a rapid growth in the 1980s and 1990s. Petrochemical industry mainly comprises of synthetic fibre / yarn, polymers, Synthetic Rubber (elastomers), Synthetic detergent intermediates, performance plastics and plastic processing industry. Today, petrochemical products permeate the entire spectrum of daily use items and cover almost every sphere of life like clothing, housing, construction, furniture, automobiles, household items, agriculture, horticulture, irrigation, packaging, medical appliances, electronics and electrical etc.⁶ The demand forecast for the major Petrochemicals as follows:-

Demand Forecast– Major Products

	Product	Yr 2017			Capacity	Yr 2025	Yr 2030	Yr 2040
		Supply	Demand	Gap	Installed+ under Construction	Demand	Demand	Demand
1	Polyvinyl Chloride (PVC)	1444	3085	1641	1482	5885	7610	11425
2	Polypropylene (PP)	4707	4486	(221)	8385	9440	13335	22735
3	LLDPE+HDPE +LDPE	4131	5045	914	7683	10430	15068	29493
4	MEG	1608	1985	377	2400	3073	3740	5030
5	SBR/ Butyl Rubber	143	399	256	470	803	1166	2172
6	Acetic Acid	420	966	546	633	1320	1534	2022
7	Butyl Acrylate	0	164	164	340	254	325	529

Number in parenthesis () show surplus

Source: Ministry of Petroleum and Natural Gas.⁷

Scenario of the Export and Import of Petrochemicals in India

Market size of the Chemicals industry in India stood at \$178 bn in 2018-19. Total production of major chemicals and petrochemicals stood at 27,858 MT during 2018-19, a growth of 4.18% over 2017-18. Alkali chemicals had the largest share in the Chemical industry in India with approximately 69% share in the total production.

⁵ 2019 Asia Petrochemical Industry Conference ,May 16th – 17th 2019, Taipei, Taiwan

⁶ <https://chemicals.nic.in/petrochemicals>

⁷ Pictorial representation of the Historical domestic demand of Petrochemicals in India .

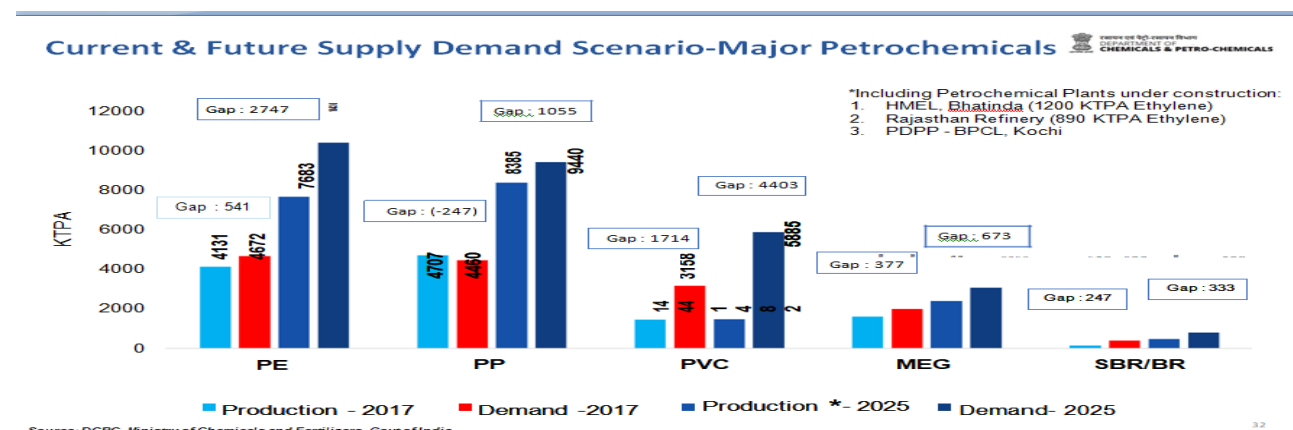
Production of polymers accounts for around 61% of the total production of basic major petrochemicals. The petrochemical demand is expected to grow at 7.5% CAGR from FY 2019-23, with polymer demand growing at 8%. The agrochemicals market in India is expected to grow at 8% CAGR reaching \$3.7 bn by FY22 and \$4.7 bn by FY25. The specialty chemicals constitute 22% of total chemicals and petrochemicals market in India. As of FY18, the total market size is around \$35 bn. The demand for speciality chemicals is expected to grow at 12% CAGR from FY19-22⁸.

Production of selected Major Chemicals and Petrochemicals (Figures in 000'MT)

Group	2014-15	2015-16	2016-17	2017-18	2018-19	CAGR	2019-20 (April 19 to Sep.19)
Alkali Chemicals	6625	6802	7009	7631	8043	4.97	4112
Inorganic Chemicals	944	1002	1053	1058	1064	3.03	499
Organic Chemicals	1619	1589	1638	1799	1884	3.87	922
Pesticides	186	188	214	213	217	3.83	93
Dyes & Pigments	285	304	320	367	382	7.54	191
Total Basic Major Chemicals	9660	9884	10234	11069	11589	4.66	5817
Synthetic Fibers	3532	3558	3599	3625	3601	0.49	1933
Polymers	7558	8839	9163	9276	10040	7.36	4785
Elastomers (S.Rubber)	172	242	285	308	351	19.58	178
Synth. Detergent Intermediates	596	566	664	743	687	3.63	337
Performance Plastics	1591	1700	1799	1719	1589	-0.04	821
Total Basic Major Petrochemicals	13448	14905	15510	15670	16269	4.88	8054
Total Basic Major Chemicals and Petrochemicals	23108	24788	25744	26739	27858	4.78	13871

Note: The total basic Chemicals and Petrochemicals production is aggregated based on monthly production returns from manufacturers under large and medium scale. Product-wise and Group wise details of installed capacity and production for major chemicals and major petrochemicals are given in Annexure-I & Annexure-II respectively.

Demand and Supply gap of the Major Petrochemicals in India



⁸ <https://www.investindia.gov.in/sector/chemicals>

Minister's Statement in Parliament on Export and Import of Petrochemicals

In a reply to the unstarred question No.1537 in Lok Sabha, dated 11.02.2020, the Minister for Chemicals and Fertilizers stated that "the import of chemicals and petrochemicals has increased during the last five years. The data of imports of major Chemicals and Petrochemicals monitored by the Department of Chemicals and Petrochemicals for the last five years is as under:

Year	Imports (000 MTs)
2014-15	10105
2015-16	11041
2016-17	11338
2017-18	12345
2018-19	12663

It may be seen that imports of Chemicals & Petrochemicals has been increasing during the last five years. This increase of imports of chemicals & petrochemicals is due to insufficient domestic production capacity to meet the growing domestic demand, comparatively higher cost of production in the country, also due to comparatively smaller scale of operations. The government has no plan to increase exports incentives under the Merchandise Exports from India Scheme (MEIS). Currently, there is no proposal under consideration of Department of Revenue to increase import duty to cut down imports".

Further, in a reply to an unstarred Question no 352, on 19/11/2019, the Minister of chemicals and Fertilisers stated that "the details of domestic production of major chemicals and petrochemicals in the country during each of the last three years and in the year 2019 of the production of basic major chemicals are as below :

(a) The details of production of basic major chemicals are as below :

Product	Quantity ('000mt)			
	2016-2017	2017-2018	2018-19	2019-20 (up to Q2)*
Alkali Chemicals	7205	7924	8382	4299
Inorganic Chemicals	1163	1184	1184	557
Organic Chemicals	1662	1830	1917	937
Pesticides and Insecticides	215	213	218	93
Dyes & Pigments	322	369	383	191
Total	10567	11520	12084	6078

(*provisional)

(a) The details of production of basic major petrochemicals are as below:

Product	Quantity ('000mt)			
	2016-2017	2017-2018	2018-19	2019-20 (up to Q2)*

Synthetic fibre	3599	3625	3675	1972
Polymers	9163	9276	12115	5968
Synthetic rubber	285	308	350	178
Synthetic detergent intermediates	664	743	687	337
Performance plastics	1799	1719	1605	829
Fibre Intermediate	4588	5068	5614	2511
Olefins	8940	10304	11535	5678
Aromatics	5374	5388	5622	2114
Other Petrochemicals	2192	2128	2292	1169
Total	36604	38559	43495	20756

(*provisional)

The import of chemicals and petrochemicals for the year 2018-19 stands at Rs. 3.63 lakh crore (as on dated 31-5-2019) as per Directorate General of Commercial Intelligence and Statistics (DGCIS). The production of domestic chemical and petrochemical is less than the demand for the same in the country. This is because chemical and petrochemical sector is a highly capital-intensive sector having long gestation period for starting operations. Shortage of feedstock/raw materials at competitive prices and high factor costs of production as compared to neighbouring countries are some of the factors which have led to increase in imports to meet the demand. The Government is considering attracting investments in this sector and following measures are being taken:

- Chemicals & Petrochemicals Sector is broadly de-licensed and de-regulated. 100% FDI is permissible under automatic route.
- Four Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIRs) have been notified in the country to give boost to the sector.
- Various other schemes are implemented and initiatives taken to promote investments in the sector for boosting domestic production.

To boost the domestic production of chemicals and petrochemicals and cut down imports and make India a manufacturing hub for the sector, the "Vision document 2024" of Department of Chemicals & Petrochemicals has been prepared to meet the growing domestic demand of chemicals and petrochemicals".

Expenditure Budget Yr2019-2020 for Ministry of Chemicals and Fertilisers are as follows:-⁹

	<i>Revenue</i>	<i>Capital</i>	<i>Total</i>
<i>Departments in the Ministry of Chemicals and Fertilisers</i>	<i>75534.05</i>	<i>0.11</i>	<i>75534.16</i>
<i>Department of Chemicals and Petrochemicals</i>	<i>263.65</i>	<i>---</i>	<i>263.65</i>
<i>Department of Fertilisers</i>	<i>75034.95</i>	<i>0.05</i>	<i>75035</i>
<i>Department of Pharmaceuticals</i>	<i>235.45</i>	<i>0.06</i>	<i>235.51</i>

Source: Budget Ministry of Finance (In Rs crores)

⁹ Ministry of Finance (GOI)

The Budget estimates Yr2020-2021 for Ministry of Chemicals and Fertilisers are as follows:-¹⁰

	<i>Revenue</i>	<i>Capital</i>	<i>Total</i>
<i>Departments in the Ministry of Chemicals and Fertilisers</i>	<i>71889.69</i>	<i>7.23</i>	<i>71896.92</i>
<i>Department of Chemicals and Petrochemicals</i>	<i>218.34</i>	<i>---</i>	<i>218.34</i>
<i>Department of Fertilisers</i>	<i>71344.95</i>	<i>0.05</i>	<i>71345.00</i>
<i>Department of Pharmaceuticals</i>	<i>326.40</i>	<i>7.18</i>	<i>335.58</i>

Source: Budget Ministry of Finance (in Rs crores)

Challenges in the Export and Imports of Petrochemicals

- Volatility of raw material prices: India has 4 naphtha based cracker complexes. Naphtha is a crude oil derived product. The prices of crude oil witnessed a significant volatility, thereby making petrochemicals prices highly volatile.
- Increased competition from abroad: Over the time, the production capacity has been increasing incessantly in methane rich Middle East and shale gas rich US. Such a production (Shale gas) edge to the US has generated a competitive advantage to the US petrochemical sector. For instance, out of the 30 million tons of ethylene capacity additions expected during the period 2014 and 2018, 12.5million tons were expected in the US alone. Since, ethane and shale gas based petrochemical products are cheaper than petrochemical products in India domestic producers are expected to witness margins pressure .¹¹
- Limited capacity of petrochemical intermediate sector: As several growth reports suggested that India's projected growth is high so the demand for petrochemical products will increase over time. Petrochemical sector uses acetic acid, acrylic acid and propylene oxide as intermediary products. The compatibility to keep up the production with demand is not very good.¹²
- New reserves discovery: Crude oil is a natural resource so its supply is limited. To keep the sector competitive, Indian firms need to find new reserves. Already, the search initiative has been taken by Oil and natural gas corporation (ONGC) for such reserves in the Indian Ocean.
- Pollution: Petro products, for example plastic, Vaseline etc. are derived from natural products namely crude oil, natural gas or uses natural resources as inputs. Extraction and production cost must be determined or adjusted according to environmental pricing principles such as Pigovian taxation, Coase Principle, etc. ¹³
- Effective regulation through a proper institution: Natural resources are wealth for a country, particularly when such resources are scarce in quantity. So every country wants them to regulate as per the rules to maintain intergenerational equity. Hence, India needs a legal autonomous institution to regulate this sector.
- Budgetary allocation: Allocations in budget is still far less than other sectors. So policy makers need to target this sector as well.
- Poor infrastructural facilities: India has poor physical infrastructure and even space to construct these basic facilities for business is very limited .¹⁴

¹⁰ Ministry of Finance (GOI)

¹¹ FICCI (2014) Handbook on Indian Chemicals and Petrochemicals Sector.

¹² *petrochemical-intermediate shortfall. McKinsey and Company, USA.*

¹³ *Coase RH (1960) The problem of social cost. The Journal of Law & Economics 3: 1-44.*

¹⁴ *FICCI (2014) Handbook on Indian Chemicals and Petrochemicals Sector.*

- Uninterrupted power supply: In India rate of growth of power generation is not same as the growth rate of demand. So Indian petrochemical sector faces interrupted power supply and unexpected power cuts. This power problem/shortage of power is a key challenge for developing country like India which is facing high competition from China, Brazil, and Singapore.¹⁵

Government Schemes Promoting Petrochemical trade in India

After the "Make in India" initiative by the government, Indian exports have increased manifold. There are numerous export schemes, financial aids and other benefits provided by the Government of India to exporters which have led to the increase in exports. The following are the various export schemes provided by the Government of India so that the Indian economy grows with a corresponding increase in foreign exchange reserves.¹⁶

- **Advance authorization scheme** This scheme allows businesses to import inputs within the country without paying any duty. However, such inputs should be utilized further for the production of an export item.
- **Advance authorization for annual requirement:** This scheme is for those exporters who have had excellent export performance for the last two years. Such exporters can benefit from the Advance Authorization for Annual requirement scheme.
- **Customs, central excise, and export duty drawback scheme:** In this scheme, the exporters can get a refund of all duty and taxes which were paid for the inputs against the exported products. The Duty Drawback is nothing but the refund that is received by the exporter. If the export schedule does not have the details of the duty drawback scheme, the exporter can speak to the tax authorities to get a brand rate as per the duty drawback scheme.
- **GST tax rebate:** The Government of India also offers rebates on GST to exporters, if such output services for the export goods are specified.
- **Duty-free import authorization:** This scheme, which is provided by the Government of India, is clubbed with the Duty Exemption Entitlement Certificate (DEEC) (Advance License) and Duty Free Replenishment Certificate (DFRC) so that the exporters can get free imports on certain products.
- **Export Promotion Capital Goods' (EPCG) zero duty scheme:** This scheme applies to all the exporters who are into electronic goods. Zero percent customs duty is to be paid by the exporter in case the export value is at least six times that of the duty saved on imports of capital goods for production, pre-production, and post-production. The exporter must confirm the value which is an export duty, within six years of the issue date.
- **Post Export EPCG duty credit scrip scheme:** As per this scheme, exporters can get an EPCG license and directly pay to the customs officials if they are not sure about paying the export obligation. The government can refund the exporter taxes which were paid earlier and which satisfy export obligations.
- **Towns of Export Excellence (TEE):** The towns of export excellence are such towns which produce and export goods which are above a particular value in some of the identified sectors. Such statuses given to the towns are based on their performance and potentiality of exports so that they can enter new markets.
- **Market Access Initiative (MAI) scheme:** This scheme provides financial advice to such agencies who directly or indirectly are involved with marketing activities like market research, capacity building, branding, and compliances in importing markets.
- **Marketing Development Assistance (MDA) scheme:** The main motive of this scheme is to encourage export activities abroad, help the export promotion councils to promote their products and to take such other measures to market internationally.
- **Scheme related to Merchandise Exports:** This scheme applies to the export of certain goods to some particular markets. Benefits for exports under this scheme are payable as a percentage of the realized Freight on Board (FOB) value.

¹⁵ *FICCI (2014) Handbook on Indian Chemicals and Petrochemicals Sector.*

¹⁶ <https://economictimes.indiatimes.com/small-biz/trade/exports/pre-exports/trading-with-the-world-export-promotion-schemes-provided-by-government-of-india/articleshow/70639514.cms>

- **Rebate of State Levies:** This scheme allows the exporters to claim refunds from the centre for all such levies and duties which are paid by the exporters at the state level.
- **Freight Assistance to Exporters:** The government has introduced Transport and Marketing Assistance (TMA) scheme to enhance the exports of agricultural products by providing a definite amount of freight charges as reimbursement and to provide help to the exporters for the marketing of agricultural products.

*New Schemes to Promote Petrochemical Industry*¹⁷

The Department of Chemicals and Petrochemicals is implementing the following schemes under the National Policy on Petrochemicals:-

➤ *National Awards for Technology Innovation in Petrochemical and downstream Plastic Processing Industry*

The Department is implementing an Award Scheme to provide incentive for meritorious innovations & inventions in various fields of petrochemicals and downstream plastics processing industry. Central Institute of Plastics Engineering and Technology (CIPET) is entrusted with the task of seeking and short-listing nominations for the scheme. The Department has been providing a grant-in-aid to CIPET each year for administering the award scheme. Presently, the Scheme is being operated as sub-scheme of the Chemicals Promotion and Development Scheme.

The National Awards for Technology Innovation are given in various categories for innovation in areas such as Polymeric Materials, Polymeric Products, Polymer Waste Management and Recycling Technology and related areas. In a ceremony held on 24 January, 2019 at Chennai, the Vice-President of the country presented the 8th National Awards. The Awards covered six categories of New Polymers, New Applications of Polymer in various fields, viz., New Polymer Processing Machines including Energy Efficiency, Innovation in Polymer Waste Management and Recycling, Green/ Bio- degradable Polymer, Innovation in Packaging covering 22 sub-categories.

➤ *Setting up of Centres of Excellence (CoE) in Polymer Technology*

The scheme aims at improving the existing petrochemicals technology and research in the country and to promote development of new applications of polymers and plastics. In phase-I of the Scheme implemented up to the year 2017, the Government of India provided financial support to the extent of maximum of 50% of the total cost of the project subject to an upper limit of Rs. 6 Crore over a period of 3 years. The Scheme was extended upto year 2020 with modified guidelines in 2016-17, which aims at promoting applied research and technology transfer from Lab to Industry and funding of Rs 5 crore per CoE. So far eight Centres of Excellence (CoE) within the premises of reputed educational/research institutes have been approved and established as per following details:-

S.No	Name of the institute where Centre of Excellence (CoE) has been established	Title of Centre of Excellence	Total Project Cost (Rs in crore)	GoI grant-in-aid approved (Rs in crore)
1	National Chemical Laboratory, Pune	Sustainable Polymer Industry to research & innovation	12.00	6.00
2.	Central Institute of Plastics Engineering & Technology, Chennai	Green Transport Network (GREET)	18.98	6.00

¹⁷ Annual Report 2019-2020 Ministry of Chemicals and Fertilisers

3.	Central Institute of Plastics Engineering & Technology, Bhubaneswar	Sustainable Green Materials	15.045	6.00
4.	Indian Institute of Technology, Delhi	Advanced Polymeric Materials	12.00	6.00
5.	Indian Institute of Technology, Guwahati	Sustainable Polymers (Sus-Pol)	14.74	6.00
6.	Indian Institute of Technology, Roorkee	Process Development, Wastewater Management in Petrochemical Industries	13.13	4.40
7.	Central Institute of Plastics Engineering & Technology, Bhubaneswar	Bio-engineered Sustainable Polymeric Systems	10.01	5.00
8.	National Chemical Laboratory, Pune	Specialty Polymers for Customized, Additive Manufacturing	5.60	2.80

➤ **Setting up of Plastic Parks**

The scheme aims at setting up of need based plastic parks, an ecosystem with state-of-the-art infrastructure and enabling common facilities through cluster development approach, to consolidate and synergize the capacities of the domestic downstream plastic processing industry. The larger objective of the scheme is to contribute to the economy by increasing investment, production, export in the sector and also generation of employment. Under the scheme, the Government of India provides grant funding upto 50% of the project cost, subject to a ceiling of Rs. 40 crore per project. The remaining project cost is funded by the State Government or State Industrial Development Corporation or similar agencies of State Government, beneficiary industries and loan from financial institutions. Under the Scheme, 6 Plastic Parks have been approved in the States of Madhya Pradesh (two), Odisha, Jharkhand, Tamil Nadu and Assam. These parks are under various stages of implementation as per following details:

Location of Plastic park	Final Approval	Land area (Acre)	Total Project Cost (Rs cr)	Total GoI grant-in-aid approved for project (Rs cr)
Tamot, Madhya Pradesh	09.10.2013	122	108.00	40.00
Jagatsinghpur, Odisha	09.10.2013	120	106.78	40.00
Tinsukia, Assam	21. 02.2014	173	93.65	40.00
Deoghar, Jharkhand	20.12.2018	93	67.33	33.67
Bilaua, Madhya Pradesh	20.12.2018	93	68.72	34.36
Thiruvallur, Tamil Nadu	05-09-2019	257	216.92	40.00

Oppurtunities in the Petrochemical Industry in India and its Export and Import

India is establishing itself as a global investment destination .India's domestic demand for petrochemicals is expected to grow at a compounded annual rate (CAGR) of 8-9 per cent through 2022-2023, according to ratings agency

CRISIL. Demand grew 8.5 per cent year-on-year in the previous fiscal, owing to healthy off take from end-use segments. “Domestic petrochemicals capacity, however, may not keep pace. It is expected to expand at 4-5 per cent CAGR between fiscals 2018 and 2023 as compared to 8-9 per cent demand growth,” the research agency said. Crude oil prices would flare up further in 2018 to range between \$68-73 per barrel, a 25-30 per cent year-on-year increase, according to CRISIL. “Global petrochemicals prices are set to rise in 2018, following uptick in feedstock prices. In fact, in the first half of 2018, petrochemical prices (except butadiene) have already climbed, given high crude oil and naphtha prices,” the agency said. It said that ethylene prices would strengthen only 10-14 per cent and the rise in ethane capacity in the US would arrest the sharp increase in ethylene prices. “With capacity addition expanding 5 per cent year-on-year against 3-4 per cent demand growth, we expect ethylene prices to range between \$1,260-1,310 per tonne in 2018. On the other hand, ethylene cash cost is expected to spurt 40-45 per cent year-on-year, on account of steeper rise in naphtha prices. Consequently, we expect cracker margins to contract in 2018 and range between \$570-590 per tonne,” the agency said. Another emerging trend is the integration of refineries with downstream petrochemical units. With high severity fluid catalytic cracking (HS-FCC), refineries are increasing the proportion of propylene to address the downstream demand-supply mismatch.¹⁸

Unveiling the PCPIR Rejuvenation Study at the ‘Summit on Global Chemicals & Petrochemicals Manufacturing Hubs in India 2019’, held in November in Mumbai, the Minister of Chemicals & Fertilizers, Government of India stated that the Indian Chemical & Petrochemical Industry is currently witnessing a rapid expansion and the untapped potential of this industry needs to be addressed with projects like reviving the PCPIRs. The government is planning to revive and further develop the four Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR), which failed to take off as envisaged to match similar international petrochemical hubs. The four hubs are at Dahej (Gujarat), Vishakhapatnam (Andhra Pradesh), Paradip (Odisha), and Cuddalore (Tamil Nadu).

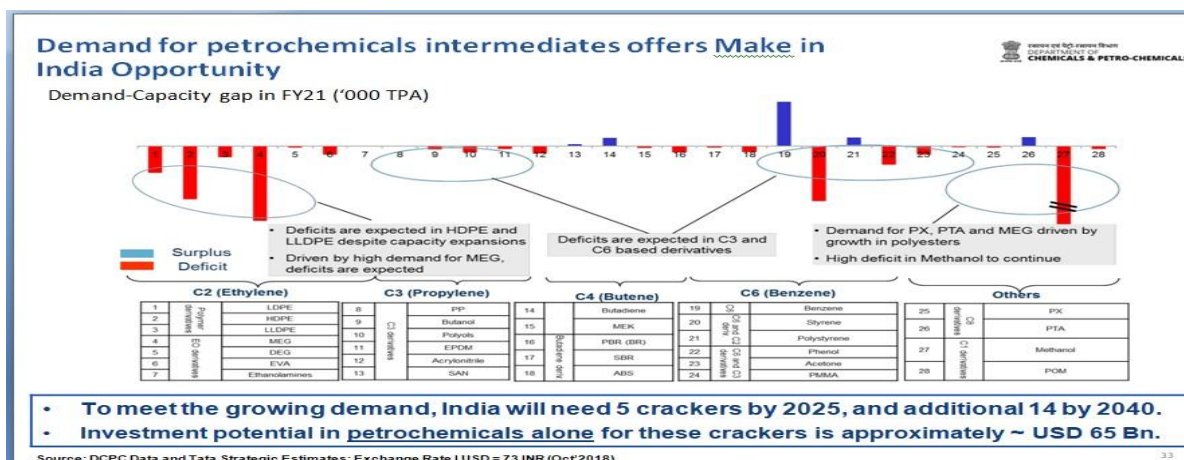
However, due to a wide range of issues (ranging from overall infrastructure development to project financing), attracting investment to Vizag, Paradip and Cuddalore has been relatively challenging in comparison to Dahej. As observed in the report the envisaged PCPIRs could not take off as global manufacturing hubs due to issues like lack of investment, infrastructure bottlenecks, land acquisition issues and limited planning. The industry is expected to grow at a CAGR of 9.3 percent from \$163 billion to \$304 billion market by 2025, which not only emphasises the important role it can play in the growth of Indian economy but also become the global leader in petrochemicals and emerge itself as world's next manufacturing hub. Considering the overall scenario, the government has now planned for policy interventions to rejuvenate investment in PCPIRs”, said the Minister.¹⁹

Considering the impact of the COVID -19 crisis on Petrochemicals and chemicals sector. Its performance will differ across value chains , with segments like packaging witnessing an uplift. In the chemicals sector ,the crisis has resulted in several Indian companies getting order inflows from global chemical players to meet the short-term supply disruptions from China, which is a credit positive for these players ,rating agency ICRA NSE 5.63 % highlighted. According to the report the lockdowns have adversely affected the demand for chemicals and petrochemicals owing to decline in consumption and shutting down of manufacturing plants ,supply chains and distribution networks .Packaging

¹⁸ <https://energy.economictimes.indiatimes.com/news/oil-and-gas/indias-petrochemical-demand-to-grow-at-8-9-through-2023-crisil/65519205#:~:text=New%20Delhi%3A%20India's%20domestic%20demand,oftake%20from%20end-use%20segments.>

¹⁹ <https://www.businesstoday.in/sectors/energy/modi-govt-plans-to-rejuvenate-petrochemical-manufacturing-hubs/story/390143.html>

especially food packaging ,sanitary and medical applications are seeing an uplift mainly due to stockpiling ,an increase in delivery services and the high healthcare focused activities .²⁰



The economic reforms initiated in 1991 brought about significant changes in the domestic petrochemical industry. Delicensing and deregulation allowed the market forces to determine investment and growth. It is now established globally that ethylene (the main building block for petrochemicals) consumption and polymer consumption in the downstream plastic articles have strong correlations with the growth of Gross Domestic Product (GDP). Polymer consumption has strong backward and forward linkages and an increase in polymer consumption has a multiplier effect on the GDP Growth. The annual consumption of virgin grade polymers for the year 2017-18 was 15.9 Million Tonnes. Demand for plastics in India is currently growing at an average rate of 8.9% for the past 4 years (2013-14 to 2017-18). It is expected to reach 24 Million Ton by 2022-23 and 35 Million Ton by 2027-28. There are more than 50,000 processing units in organized and unorganized sector (around 33,500 are in organized segment) having 1,53,500 Plastics processing machines for producing a diverse range of plastic products. The processing capacity is estimated to be 45.1 Million tonnes per annum. This processing capacity had been growing at 8.8% CAGR during last 4 years and the processing industry is expected to invest \$10 billion during the next 5 years to enhance the capacity to 62.4 Million Ton by 2027-28.²¹

Deficit in most key Chemicals products

S. No	Product	Domestic Capacity (KTA)	Demand (KTA) 2017	Net imports in 2017 (KTA)
1	METHANOL	276	2019	1767
2	ACETIC ACID	165	992	844
3	STYRENE	0	703	714
4	TOLUENE (Incl Brnz)	2251	1540	409
5	PHENOL	57	305	267
6	EVA	0	169	171
7	VAM	0	162	166
8	MDI	0	118	120
9	TDI	61	65	44
10	PO	36	67	34
11	EO (Inc MEG)	1250	1152	0
12	CUMENE	76	57	0

For some key chemical products, we don't have domestic capacities

Source: Conclave on Indian Petrochemical Industry .

²⁰ <https://economictimes.indiatimes.com/industry/indl-goods/svs/chem/-/fertilisers/covid-19-opens-up-opportunities-for-chemicals-sector-puts-margin-in-pressure-on-petrochemicals-icra/articleshow/75633636.cms?from=mdr>

²¹ <https://chemicals.nic.in/petrochemicals>

FICCI recommends measure to support export and import of the Chemicals & Petrochemicals Sector²²

According to FICCI "Key raw materials include benzene, sulphur (obtained from crude oil), caustic, chlorine, hydrogen, nitric acid, sulphuric acid, acetic anhydride (manufactured as bulk chemicals). Another example being polymers used in medical products such as blood and intravenous bags, kidney dialysis & blood transfusion equipment, cardiac catheters, endotracheal tubes, artificial heart valves etc. These industries operate in a highly integrated vogue to support the value chains and hence should be exempted from any restriction during lockout periods.

Oil refineries/petrochemical projects are in the category of national assets and the services are 'essential supplies' in nature, there is the need to ensure regular supplies of inputs/materials (in particular, related chemicals, catalysts, packing-materials and other consumable items) to the refineries and petrochemical manufacturing facilities located in different parts of the country and ports and ensure the smooth running of refineries and petrochemical projects.

Some of the key recommendations by the experts

➤ ***Trade related recommendations***

- To boost domestic exports, additional MEIS (1%) and duty drawback between 4%-5%
- The safeguard duty on any product, where it is important shall increase by 20%. Over February, import trigger safeguard duty in terms of quantitative
- Due to lower demand in Exports, Government may allow domestic sales from SEZ without charging Custom Duties to utilize domestic capacities and avoid extra import at lower prices
- The concept of Minimum Import Price shall be worked out from basic, intermediate to the final product which was earlier implemented in the steel industry should now be introduced in Chemical and Petrochemical industry. This can immensely protect Indian companies from China's dumping. Therefore, for now it is recommended that Minimum Import Price (MIP) may be declared for the next 6-9 months for all products in the Chemical and Petrochemical Industry
- It is important to increase the Safeguard Duties to ensure that imports in excessive quantities do not harm the domestic industry. In normal duty rates, the bound rate could be 75% (by considering the upper limit/boundary line)
- Suspension of FTAs for the next 6 to 9 months period, till the domestic industry revives is also recommended
- Fast track all representations for non-tariff barriers, SGD, ADD to ensure dumping of products does not take place into the Indian market from China and SEA countries in the next 6-9 months

➤ ***Operations related recommendations***

- Most chemical plants in China, Europe and US have been operational during crisis too, as they consider Chemicals as essential. It is difficult to break the chemical chain very categorically into essential and non-essential and hence it is requested that entire chemical industry should be considered as an essential sector. This will ensure essential goods supply to the Pharma sector as well
- To keep the industry ready once the economy revives again, the government should allow 50% working of these industries in this period with guidelines and safety measures (ensuring sanitization, hygiene and support for workers)

²² NEW DELHI, 4 April 2020 <http://www.ficci.in/pressrelease-page.asp?nid=3671>

- The Government must consider the plastic industry as an essential industry and permitted to operate in a scaled-down manner during the lockdown period. The current fiscal policy is not benefiting the MSME sector. There should be a 20% increase in loans without collateral for MSMEs sector
- Cash flow is critical to restart operations and therefore payment of electricity bills by the state electricity boards should have a moratorium of minimum one month and payable in 5 installments. Additionally, net GST payable should also be given a moratorium of 3 month
- Digital negotiation of documents should be allowed for exports until the lockdown is lifted
- Facilitation of port clearance for domestic Cargo-Fuels, Chemicals and Petrochemicals are crucial
- Logistics chain must be unlocked. Task force can be set up at government level

➤ ***Custom Duty related recommendations***

In order to protect the existing investments of the Indian Polymer Producers and Polymer Processors, and for attracting new investments in the sector, it is essential to provide the sector with reasonable Duty Differential over their respective raw materials.

- Basic Custom Duty on primary Feedstock i.e. on Crude, Natural Gas /NGLs, Naphtha and Reformate shall be NIL
- Basic Custom Duty on Polymers i.e. Polypropylene (HS Codes 39021000 and 39023000) and Polyethylene (HS Codes 39011010, 39011090, 39012000) shall be revised from current 7.5% to 12.5%
- Basic Custom duty on Products made of Polymers (HS Codes 3916 to 3926) shall be revised to min. 20%, while ensuring that a minimum duty differential of 10% is maintained over the Intermediate products
- Import Duty on Titanium Dioxide (HS Code 3206 1100) shall be reduced from 10% to 5%
- To prevent under-invoicing in the import of Polymers & Products made of Polymer, Anti-Dumping or Safeguard Duty should be applied on import of cheap Finished Products, and polymers in consultation with the Indian Petrochemical Industry²³

Initiatives taken to Improve the trade in Petrochemical Industry

➤ ***Petrochemical industry and health hazard***

Chemicals & Petrochemicals produced domestically and imported may contain impurities & may be hazardous to human safety, health & environment. These products while in use may not be meeting technical characteristics prescribed in the BIS standards, presently being voluntary in nature. It is therefore of paramount importance to improve quality of Chemicals/Petrochemicals produced in the country as well as to monitor the imported chemicals. With this objective, the Department of Chemicals and Fertiliser has initiated an exercise to make the standards of Chemicals/Petrochemicals as mandatory to ensure that both the exporters of such chemicals to the country and domestic manufacturers meet the BIS quality parameters. Such Chemicals/Petrochemicals shall bear the standard mark under a licence to be obtained from Bureau of Indian Standards .This mechanism shall help in improving quality of these products as some countries dump poor quality and spurious Chemicals/Petrochemicals in the country, which do not meet the quality parameters laid down by BIS Standards as at present. Hence this Department has initiated steps to make standards mandatory in public interest under section 16 of the Bureau of Indian Standard Act 2016 for:

²³ <http://www.ficci.in/pressrelease-page.asp?nid=3671>

- (i) Protection of human, animal or plant health
- (ii) Safety of the environment
- (iii) Prevention of unfair trade practices
- (iv) Protection of National Security

The Department has initiated an exercise to formulate Chemical (Management & Safety) Rules with the objective to ensure a high level of protection of human health and the environment impacted by the use of chemicals. It is expected that the full implementation of this regulation shall promote innovations in greener and safer chemistry within chemicals manufacturing, transport, use and disposal and enhance the competitiveness of domestic chemical industry. These chemical safety rules are proposed to be framed under Environment (Protection) Act 1986. These rules will be for Notification, Registration and Restrictions on Substances, Mixture and Intermediates placed in Indian Territory.

➤ ***Better Trade Intelligence***

As per World Customs Organization, international trade of commodities is monitored under ITC HS classification. There are many residual entries under 'Others' under different chapters. The import under 'Others' category is huge in terms of quantity and value. So to know the specific names of the chemicals and petrochemicals covered under 'Others' it is very important to assign new HS Codes for numerous chemical and petrochemical products. There are above 2500 tariff lines pertaining to specific chemicals and petrochemicals, and approximately 500 tariff lines pertaining to others. To have better trade intelligence all chemicals and petrochemicals with high trade value are to be given separate HS Codes. So far Department has recommended 106 chemicals and petrochemicals for creation of new HS Codes.

Way Forward

The petrochemicals sector is a major segment of manufacturing industry and plays a pivotal role in various downstream industries. However, despite the importance of the petrochemicals industry in the manufacturing sector, the sector still lacks a climate that is conducive to new investment that is needed to meet future projected demand. This is partly because of oversupply in the global market, leading to a steep decline in the prices of petrochemicals. In addition, factors like establishment of new capacities in Middle East backed by subsidised feedstock, low import duties on finished products coupled with high internal transaction costs, infrastructural constraints has resulted in reduced interest in this sector. The above mentioned factors emphasize the need to identify and take appropriate steps to maintain competitiveness and cost effectiveness of the Indian petrochemical industry.²⁴

India is considering a proposal to levy 15% Covid-19 tax on all chemical and petrochemical imports from May 1, 2020 to March 31, 2021 to protect domestic industry. As per the proposal, the provisional duty would also be applicable on all preferential imports under India's various free trade agreements (FTA), and would cover organic chemicals, inorganic chemicals, plastics, rubber, man-made filaments and man-made staple fibres. The proposal has been made by a certain section of industry to the department of chemicals and petrochemicals.²⁵

²⁴ Indian Council for research on International Economic Relations, Working Paper 271, feedstock for the Petrochemical Industry

²⁵ <https://economictimes.indiatimes.com/news/economy/foreign-trade/petrochem-chemical-imports-likely-to-face-15-covid-tax/articleshow/75834553.cms>

The government is planning to revive and further develop the four Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR), which failed to take off as envisaged to match similar international petrochemical hubs.

The PCPIR Rejuvenation Study, which analyses the current status of the four zones and the growth potential of the industries, recommends measures to be done to attract investments into these clusters. It was jointly prepared by the Federation of Indian Chambers of Commerce & Industry (FICCI) and knowledge partner Mott MacDonald. India is the sixth largest producer of chemicals in the world and contributes 3.4 percent to the global chemical industry. However, per capita consumption of chemical products in India is low (1/10th of the global average). The chemicals market in India has grown only at 3 percent over the last decade and India is dependent on imports to meet demand in the case of most petrochemical products. The Dahej PCPIR, located at Bharuch in Gujarat, has made US\$13.6 billion so far, with US\$ 2.4 billion investment made for infrastructure development by the Gujarat Infrastructure Development Corporation (GIDC). It is spread across an area of about 453 square kilometres. Anchor investments include \$4 billion by ONGC Petro Additions Limited (OPaL), which has set up a grass root mega petrochemical complex spread across an area of 508 hectare in the PCPIR. Major investors in the region include Reliance, BASF, Aditya Birla, Welpun, GACL, Adani, SRF, GSPL, Torrent and Lanxess. Various projects by Nayara Energy, Godrej, Agrovot, Polyplastics, Thermax, Astral Pipes, Neogen Chemicals and few others are under implementation. The proposed and committed investments in various infrastructure projects in this PCPIR region is about \$2.4 billion. The Andhra Pradesh PCPIR is the largest PCPIR in the country spread over an area of about 640 square kilometres between Visakhapatnam and Kakinada. Existing industries in the region include HPCL Visakh refinery, Coromandel Fertilizers, NTPC Simhadri Power Plant and Andhra Petrochemicals, Hetero Drugs, and the Kakinada region has 7 power projects and 2 chemical and fertilizer plants. As of FY 19, committed and actual investments made so far amount to \$6.82 billion and \$1.98 billion, respectively. At the Paradip PCPIR in Orissa, investments worth only \$6.43 bn have been made, which include investment in industrial establishments and infrastructure development. IFFCO, Paradip Phosphates Ltd, Paradip Carbon Ltd and Deepak Fertilizers & Petrochemicals are few of the major investments made in the PCPIR region. The Government of India had identified a PCPIR in Tamil Nadu in 2017, to be developed over an area of 256 sq km across 45 villages in Cuddalore and Nagapattinam districts, but it has not taken off as proposed. Except for the anchor tenant (NOCL), no major investments have been made in the region. The report suggests government support in the form of single window fast-track clearance, environment clearance for the entire PCPIR (eg. Dahej PCPIR), subsidised power, tax incentives similar to those applicable in SEZs, appointment of full-time management board with CEOs heading each PCPIR, reduction in clearance timelines, etc.²⁶

Prime Minister on January 28, 2019 on the event of a refinery expansion project by Bharat Petroleum Corporation (BPCL) in Kochi stated that most of the petrochemicals being used in India are sourced through imports and it will be the government's endeavour to ensure they are manufactured domestically. Further, the Prime Minister stated that :-

²⁶ <https://www.businesstoday.in/sectors/energy/modi-govt-plans-to-rejuvenate-petrochemical-manufacturing-hubs/story/390143.html>

“Petrochemicals are a grade of chemicals which we do not speak much about, but they exist invisibly and touch many aspects of our daily life. This includes building materials, plastics and paints, foot-wear, clothing and other fabrics or auto-motive parts, cosmetics and medicines. However, most of these chemicals are imported from other countries. It is our endeavor to see that these petro-chemicals are manufactured in India itself,” India is the second-largest oil refiner in Asia and is emerging as refinery hub in the region, refining more than its demand. According to BPCL, the new integrated refinery expansion complex of Kochi Refinery was implemented at a cost Rs 16,504 crores. After expansion, the refining capacity has increased to 15.5 Million Tonnes Per Annum, from the earlier 12.4 MTPA, making it the largest public sector oil refinery project. BPCL’s upcoming petrochemical complex is expected to go on stream by the end of 2022. Government has taken decisive steps to reduce crude oil imports and save foreign exchange, adding that this involves establishing 12 second-generation ethanol plants in 11 states and six Memorandum of Understandings (MoUs) have already been signed in this direction”.

Petrochemicals and Environmental concern affecting trade

Petrochemicals face a number of climate, air quality, and water pollution challenges. Petrochemical products provide substantial benefits to society, including a growing number of applications in various cutting-edge, clean technologies critical to a sustainable energy system. However, the production, use and disposal of these products poses a variety of sustainability challenges that need to be addressed. Even though the chemical sector consumes roughly as much energy as the steel and cement sectors combined, it emits less CO₂ than either sector. Still, this amounts to around 1.5 GtCO₂, which is 18% of all industrial-sector CO₂ emissions, or 5% of total combustion-related CO₂ emissions. This is in part because the chemical industry consumes more oil and gas than other heavy industries, which tend to rely more on coal. Another contributing factor is that the carbon contained in chemical feedstocks is mostly locked into final products (such as plastics) and released only when the products are burned or decompose. In our Clean Technology Scenario (CTS), which provides an ambitious but achievable pathway for the chemical sector, environmental impacts decline across the board. In the CTS, air pollutants from primary chemical production decline by almost 90% by 2050; and water demand is nearly 30% lower than in the base scenario. The CTS also emphasises waste management improvements to rapidly increase recycling, thereby laying the ground work to more than halve cumulative, ocean-bound, plastic waste by 2050, compared to the base scenario – a major step to curb the 10 million tonnes of plastic waste that leak into the world’s oceans every year, an environmental problem that is garnering much attention across the globe. The surge in the share of lighter oil products required for petrochemical feedstocks may pose challenges for refining in the CTS. Oil demand related to plastic consumption overtakes that for road passenger transport by 2050. This has important implications for refiners whose processes are currently set up to produce both heavy and light products. The increase in light tight oil (LTO) production in the United States is expected to help address the challenge because LTO is an easier starting point for producing lighter oil products. However, the long-term sustainability of this contribution will also depend on how the resource base, technology, and market conditions of LTO evolve.²⁷

²⁷ <https://www.iea.org/>

Annexure I

Historical Domestic Demand of Major Petrochemicals (KTPA)

End Product	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Polyvinyl Chloride (PVC)	1738	1939	2144	2389	2574	2622	2936	3158
Polypropylene (PP)	2382	2579	2830	3176	3276	3500	4250	4460
HDPE	1303	1268	1302	1657	1657	1947	2123	2372
LLDPE	1059	1467	1474	1529	1523	1450	1779	1734
LDPE	348	363	379	434	428	489	551	566
Polyether Polyols	83	146	160	179	180	201	237	226
Polycarbonate (PC)	53	102	114	120	121	122	134	135
Styrene-Butadiene Rubber	157	195	214	207	244	263	267	290
Ethylene-vinyl Acetate (EVA)	78	100	95	118	125	145	166	143
Butyl Rubber	66	70	82	78	79	83	91	100
Acetic Acid	523	614	705	801	815	866	942	993
Acrylonitrile Butadiene Styrene (ABS)	114	131	134	147	165	177	207	220
Other (Basic Major Petrochemicals)	4361	4401	4171	4137	3899	4394	4139	4073
Total (Basic Major Petrochemicals)	12265	13375	13804	14972	15086	16258	17822	18470

Fig 1: Presentation by Sandeep Poundrik (JS) Refineries Ministry of Petroleum and Natural gas Petrochemicals : opportunities and Challenges.

Annexure II

Projected deficit of Building blocks: 2030 and 2040

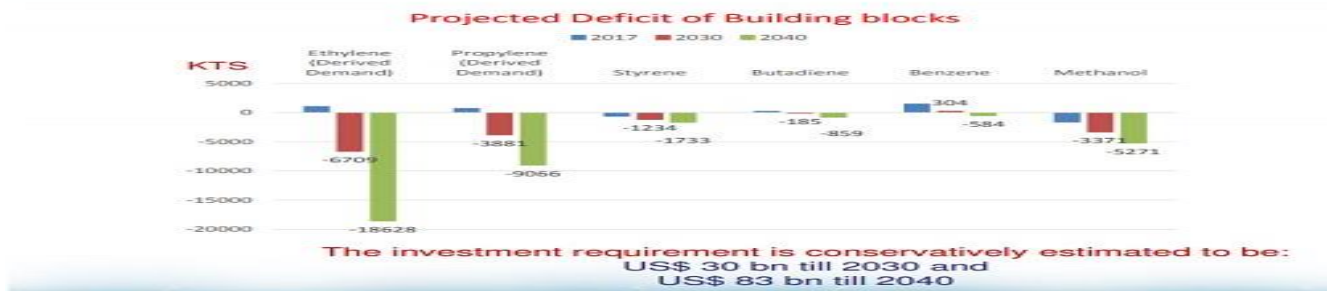


Fig 2 Presentation by Kamal Nanavaty (Conclave on Indian Petrochemical Industry Indian Chem 2018- 10th Biennial International Exhibition and Conference Bombay Exhibition Centre, Mumbai 5th Oct 2018)

Projected deficit of end products : 2030 and 2040

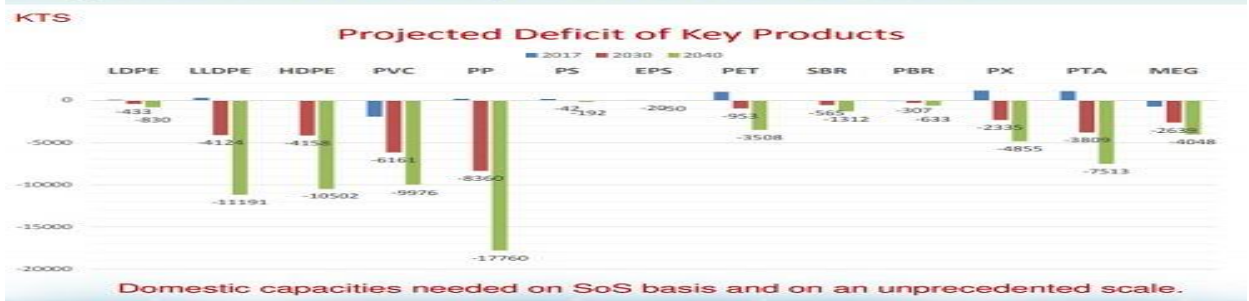


Fig 3 Presentation by Kamal Nanavaty (Conclave on Indian Petrochemical Industry Indian Chem 2018- 10th Biennial International Exhibition and Conference Bombay Exhibition Centre, Mumbai 5th Oct 2018)

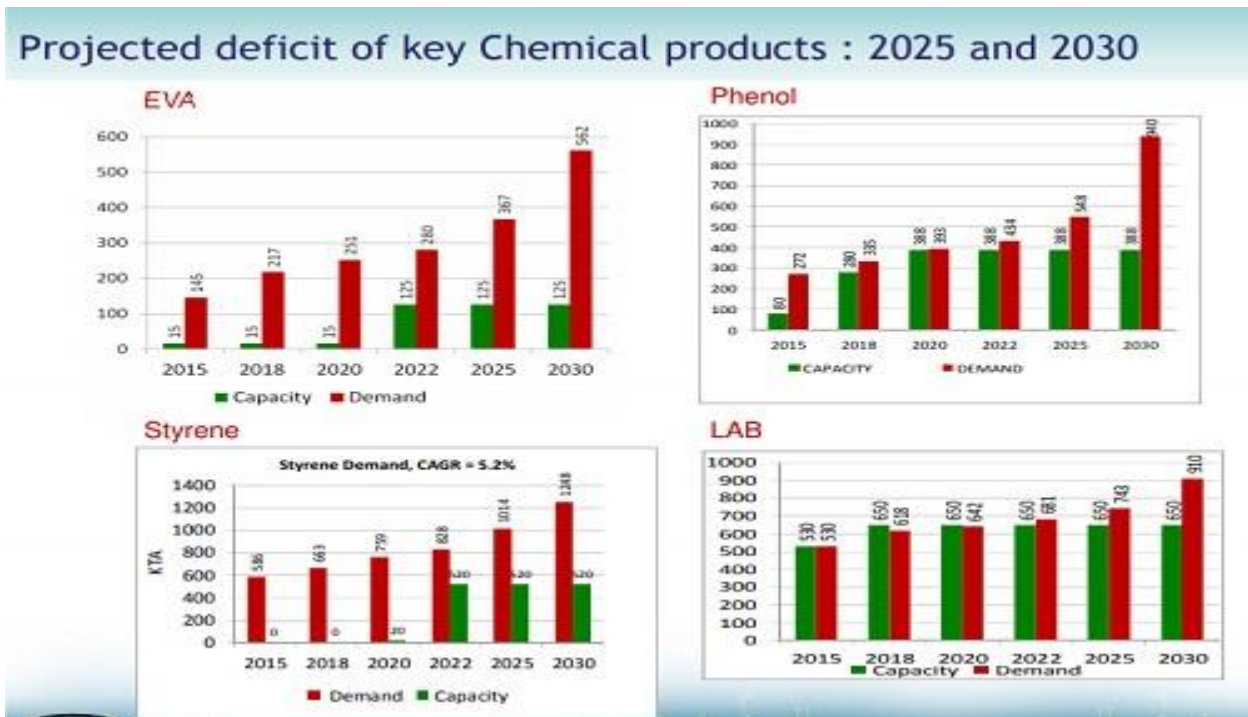


Fig 4 Presentation by Kamal Nanavaty (Conclave on Indian Petrochemical Industry Indian Chem 2018- 10th Biennial International Exhibition and Conference Bombay Exhibition Centre, Mumbai 5th Oct 2018)

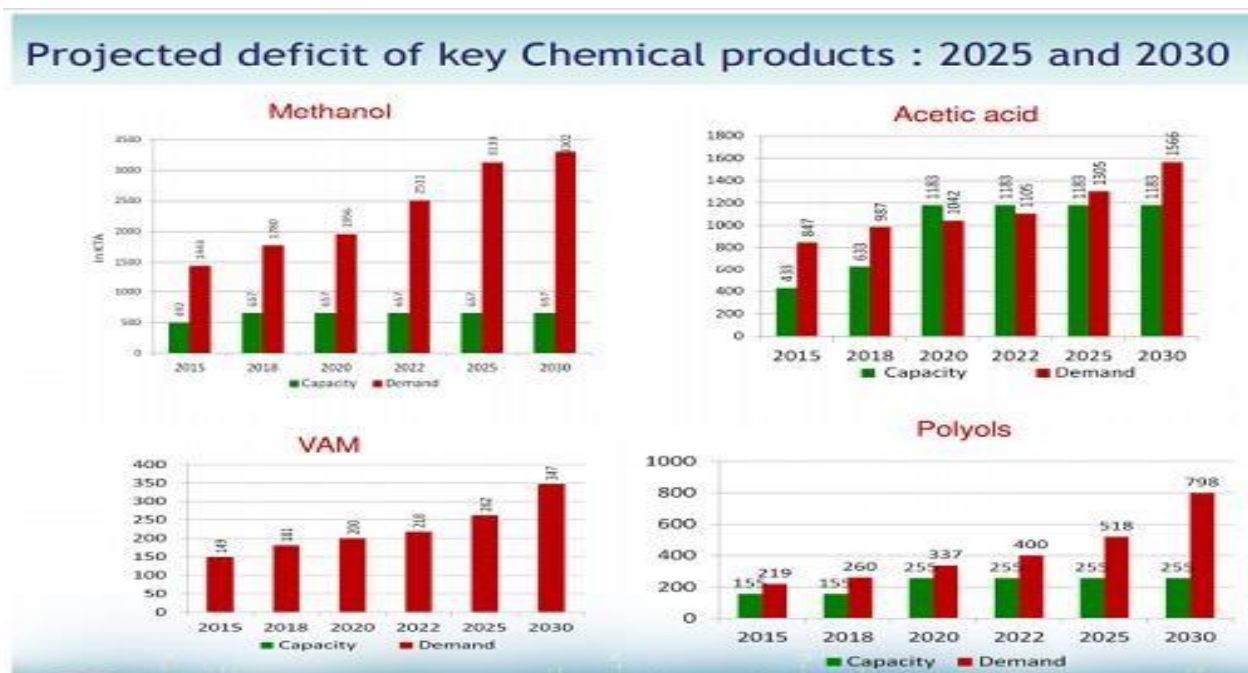


Fig 5 Presentation by Kamal Nanavaty (Conclave on Indian Petrochemical Industry Indian Chem 2018- 10th Biennial International Exhibition and Conference Bombay Exhibition Centre, Mumbai 5th Oct 2018)

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