CHEMICALS

APRIL 2017 (As of 21 April 2017)

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In terms of value and production volume, Indian chemical industry is the 3rd largest producer in Asia & 6th by output in the world. Indian chemical industry could grow at 11 per cent p.a. to reach size of USD224 billion by 2017.

- In 2016, India chemicals industry had a market size of USD139 billion.
- By 2025, the Indian chemical industry is projected to reach USD403 billion.

The chemical industry in India is a key constituent of Indian economy, accounting for about 2.11 per cent of the GDP.

- More than 70,000 commercial products such as petrochemicals & basic chemicals are covered under chemical sector.

India accounts for approximately 16 per cent of the world production of dyestuff & dye intermediates, particularly for reactive acid & direct dyes.

India is currently the world’s 3rd largest consumer of polymers & 3rd largest producer of agrochemicals.

- Indian specialty chemical market is expected to reach USD70 billion by 2020.

Value exports of inorganic chemicals from India is estimated at USD1.21 billion in FY16, with the organic chemical market reaching USD11.51 billion in FY16. Exports of organic chemicals from India stood at USD4.02 billion in FY16.

**Source:** Make in India, Confederation of Indian Industry, TechSci Research

**Notes:** PCPIR - Petroleum, Chemicals and Petrochemical Investment Regions; E – Estimates, (1) April 2015-January 2016
ADVANTAGE INDIA

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Robust Demand
- A large population, dependence on agriculture & strong export demand are the key growth drivers for the chemicals industry
- Per-capita consumption of chemicals in India is lower relative to Western peers & there exists a large latent demand

Attractive Opportunities
- Polymers & agrochemicals industries in India present immense growth opportunities
- In FY15, India’s construction chemical market was valued at USD589.58 million, thereby representing ample growth opportunity in chemical sector.
- In 2016, polymer production in India was recorded at around 9 million tons.

Increasing Investments
- Lured by the size & returns of the Indian market, foreign firms have strengthened their presence in India
- From April 2000 to December 2016, total FDI inflows into the Indian chemicals industry (excluding fertilisers) were USD12.68 billion.

Policy Support
- In 2015, CII launched 2nd phase of “Chemistry Everywhere” campaign to boost the growth of chemical industry in India
- 100 per cent FDI is permissible in the Indian chemicals sector; manufacturing of most chemical products is de-licensed
- Setting up of PCPIRs
- The Government of India has launched the Draft National Chemical Policy, which aims to increase the share of chemical sector in the country’s GDP

Source: FICCI, Make in India, Department of Industrial Policy and Promotion (DIPP), TechSci Research
Notes: PCPIR - Petroleum, Chemicals and Petrochemical Investment Regions, CII – Confederation of Indian Industry; E – Estimates

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MARKET OVERVIEW AND TRENDS
Source: FICCI, Make in India, CII, TechSci Research
Note: MNC – Multinational Corporation, DCPC - Department of Chemicals and Petrochemicals

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**EVOLUTION OF THE INDIAN CHEMICAL INDUSTRY**

- **Basic needs (1950-72)**
  - Chemical products to protect crops
  - Agrochemicals, dyes, pharmaceuticals

- **Establishment (1972-80)**
  - Public sector companies were set up to develop the petrochemical industry
  - Plastic & fibres, petrochemical products

- **Consolidation (1980-92)**
  - Consolidation started from largely fragmented firms with small capacities & high cost structures
  - Paints, dyes, pharmaceuticals & detergents

- **Liberalisation (1992-95)**
  - Major investment plans by both Indian firms & MNCs
  - Lower tariff barriers
  - Diminishing role of public sector companies
  - Petrochemicals, engineering plastic, specialty fibres

- **Expansion (1995 onwards)**
  - In 2015, DCPC has announced to design a 16 point plan framework that would encourage the domestic production of chemicals
  - Alliances & partnerships to achieve scale
  - Licensing requirements removed except in the case of hazardous chemicals
  - Increasing investments by foreign players in India through mergers & acquisition & joint ventures
  - Allowed 100 per cent FDI in the chemicals Industry
  - In 2016, Partnership between Indian Chemical Council (ICC) & the Tamil Nadu Pollution Control Board (TNPCB) promoted development of chemical industry by launching "Responsible Care®" programme, which aims at achieving sustainable development in chemical industry

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## Major Segments of the Indian Chemical Industry

<table>
<thead>
<tr>
<th>Segment</th>
<th>Products/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base chemicals</strong></td>
<td>• Petrochemicals, man-made fibres, industrial gases, fertilisers, chlor-alkali, other organic &amp; inorganic chemicals</td>
</tr>
<tr>
<td><strong>Specialty chemicals</strong></td>
<td>• Dyes and pigments, leather chemicals, construction chemicals, personal care ingredients &amp; other specialty chemicals</td>
</tr>
<tr>
<td><strong>Pharmaceuticals</strong></td>
<td>• Active Pharmaceutical Ingredients (APIs) &amp; formulations</td>
</tr>
<tr>
<td><strong>Agrochemicals</strong></td>
<td>• Insecticides, herbicides, fungicides &amp; other crop protection chemicals</td>
</tr>
<tr>
<td><strong>Biotechnology</strong></td>
<td>• Bio-pharma, bio-agri, bio-services &amp; bio-industrial products</td>
</tr>
</tbody>
</table>

Source: TATA Strategic Management Group, TechSci Research

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## PRODUCT-WISE CLASSIFICATION OF THE INDIAN CHEMICAL INDUSTRY

<table>
<thead>
<tr>
<th>Chemicals</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alkali chemicals</strong></td>
<td><strong>Inorganic chemicals</strong></td>
<td><strong>Organic chemicals</strong></td>
<td><strong>Pesticides &amp; insecticides</strong></td>
</tr>
<tr>
<td>Soda ash</td>
<td>Aluminum fluoride</td>
<td>Acetic acid</td>
<td>Dichlorodiphenyltrichloroethane (DDT)</td>
</tr>
<tr>
<td>Caustic soda</td>
<td>Calcium carbide</td>
<td>Acetone</td>
<td>Malathion</td>
</tr>
<tr>
<td>Liquid</td>
<td>Carbon black</td>
<td>Phenol</td>
<td>Parathion</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Potassium chloride</td>
<td>Methanol</td>
<td>Ethicon</td>
</tr>
<tr>
<td></td>
<td>Titanium dioxide</td>
<td>Ortho Nitro Chlorobenzene (ONCB)</td>
<td>Endosulphan</td>
</tr>
<tr>
<td></td>
<td>Red phosphorus</td>
<td>Isobutyl</td>
<td>Phosalone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Para Nitro Chlorobenzene (PNCB)</td>
<td>Phorate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ethyl</td>
<td>Acephate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alkyl Amines</td>
<td>Fenvalerate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acetic Anhydride</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formaldehyde</td>
<td></td>
</tr>
</tbody>
</table>

*Source: TechSci Research*
CHARACTERISTICS OF THE INDIAN CHEMICAL INDUSTRY

- As on 2015, the National Chemicals Policy of India which is expected to help in improving the chemical industry is in final stages & as a part of this, the Government is planning to launch Indian Bureau of Corrosion Control & setting up National Chemical Centre that could prevent losses from corrosion & act as a repository information center for the chemical industry.
- Strong economic growth & rise in per-capita income has meant a steady increase in demand for chemicals.
- Expected to clock a growth of 10-13 per cent over the coming years.
- The industry has left behind a low-growth and regulated environment to emerge more mature.
- There is strong government support towards R&D; this would benefit the sector.
- In 2015, Department of Chemicals & Petrochemicals added 3 new chemical & petrochemical products under its supervision.
Total chemical production in India was 9632 MT in FY15 & reached to 9884 MT in FY16. The growth of 2.61 per cent was registered from FY15 to FY16.

Favourable demographics & strong economic growth are driving demand for chemicals.

External demand & specialty chemicals have also contributed strongly to the growth of the industry.

India’s growing per capita consumption & demand for agriculture-related chemicals offers huge scope of growth for the sector in the future.

Source: Department of Chemicals and Petrochemicals, TechSci Research
Note: MT - Metric Tonne
With almost 69 per cent share in the total production, alkali chemicals accounted for the largest share in Indian chemical industry in FY16. During FY16, production of alkali chemicals in India stood at 9884 MT.

In March 2017, ONGC Petro additions Ltd (OPaL) petrochemicals complex, located at Dahej, Gujarat, became operational. Being a single largest petrochemical plant in India, it has a capacity to produce 14 lakh metric tonnes of polymers, high density polyethylene (HDPE), linear low density polyethylene (LLDPE), polypropylene (PP) & 5 lakh metric tonnes of chemicals like pyrolysis gasoline, benzene & butadiene annually.
Chemical exports from India stood at USD13.58 billion for FY17\(^{(1)}\).

Exports in the chemical industry grew from USD22.43 billion in FY13 to USD26.97 billion in FY16, registering a growth of 4.71 per cent.
Total imports of chemicals grew from USD31.22 billion in FY13 to USD38.95 billion in FY16, a CAGR of 5.68 per cent.

Total imports of chemicals reached USD20.06 billion in the FY17(1).

India’s chemical imports (USD billion)

Source: Ministry of Commerce, DGCI&S, TechSci Research
Notes: FY17(1) - Data is for April – September ’16
CAGR - Compound Annual Growth Rate
During FY16, organic chemicals accounted for a share of 41.53 per cent in India’s total chemical exports, followed by miscellaneous chemicals which accounted for a share of 11.07 per cent, in overall chemical exports from India.

Within agrochemicals herbicide is the largest segment globally, however, consumption of insecticides in India is dominating. Growth of agro chemicals is largely driven by export demand.

Source: Ministry of Commerce, TechSci Research
Note: CAGR - Compound Annual Growth Rate
Others include Plastics and Articles thereof, Synthetic Rubber and Factice, Man-made Filaments & Man-made Staple Fibers
Organic chemicals also dominate imports, with a share of 38.94 per cent, followed by inorganic chemicals at 12.67 per cent in FY16.

**Shares in imports of chemicals in FY16**

- **Organic**: 38.94%
- **Others**: 12.67%
- **Miscellaneous Chemicals**: 10.39%
- **Dyes & Dye Stuffs**: 4.00%
- **Inorganic**: 34.00%

*Source: Ministry of Commerce, TechSci Research*

Note: CAGR - Compound Annual Growth Rate

Others include Plastics and Articles thereof, Synthetic Rubber and Factice, Man-made Filaments & Man-made Staple Fibers
CHEMICAL INDUSTRY HOLDS A SIGNIFICANT POSITION IN THE ECONOMY

- 2.11 per cent of national GDP
- Government allows 100 per cent FDI in the chemical sector
- 3rd largest chemical industry in Asia, preceded by China & Japan
- India’s chemical industry (2013-16)
- 10.6 per cent of total exports & 10.5 per cent of total imports in FY16
- In 2025, chemical industry is expected to grow & reach USD403 billion Mark from USD139 billion in 2016
- One of the most diversified sectors, covering more than 70,000 commercial products

Source: FICCI, TechSci Research
Notes: Figures mentioned above is taken from Dept. of Chemicals and Petrochemicals; FY16(1) - (April- December 2015)
Contribution to global chemical industry would increase

- Global chemical industry: USD3.26 trillion
- India chemical industry: USD144 billion

Source: FICCI, TechSci Research

Notes: CAGR - Compound Annual Growth Rate, E - Estimate

Strong growth outlook for the Indian chemicals industry (USD billion)

- 2013: 118
- 2015: 144
- 2017E: 224

CAGR: 17.4 per cent

Source: FICCI, TechSci Research

Notes: CAGR - Compound Annual Growth Rate, E - Estimate
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WIDESPREAD CHEMICAL INDUSTRY INFRASTRUCTURE ACROSS INDIA … (2/2)

Source: D&B, TechSci Research
**KEY DOMESTIC AND INTERNATIONAL PLAYERS IN INDIAN CHEMICAL INDUSTRY**

<table>
<thead>
<tr>
<th>Domestic company</th>
<th>Sales in FY16(^{(1)}) (USD billion)</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tata Chemicals Limited (TCL)</td>
<td>1.62</td>
<td>Soda ash, salt, marine chemicals, caustic soda, cement, etc.</td>
</tr>
<tr>
<td>United Phosphorus Limited (UPL)</td>
<td>0.91</td>
<td>Agrochemicals</td>
</tr>
<tr>
<td>Gujarat Heavy Chemicals Ltd (GHCL)</td>
<td>0.4</td>
<td>Soda ash</td>
</tr>
<tr>
<td>Gujarat Alkalies and Chemicals Ltd (GACL)</td>
<td>0.30</td>
<td>Caustic soda</td>
</tr>
</tbody>
</table>

French specialty chemicals major, Arkema, plans to invest USD 15 million for setting up a new polyester powder resin manufacturing facility, the 1\(^{st}\) of its kind in India.

As of October 2016, industrial chemicals manufacturer, Thirumalai Chemicals Ltd., plans to enhance its production capacity of phthalic anhydride & fine chemicals in India.

The investment expo in the Odisha, organised on 2nd December, 2016, ended with investment promises worth USD 29.87 billion and 1.4 lakh jobs for the state in 10 sectors, including chemicals.

German chemical company, BASF, revealed plans to setup its 1\(^{st}\) manufacturing plant in Myanmar in 2017, in order to meet the growing demand for construction chemicals. The new plant will be designed specifically to manufacture customised construction chemical solutions for the local building market.

KBR, a US based firm, secured a deal to modernise MCF”s (Mangalore Chemical & Fertilizers) ammonia plant in Panambur, Mangalore, to improve energy efficiency of the plant, by providing its new ammonia technology.

As of March 2017, Dow Chemical plans to increase its polyurethane (PU) system production facility located in Ratnagiri, Maharashtra by 50 per cent, with an aim to expand its manufacturing base in India. In addition, the company plans to invest in a new technology center in Mumbai to improve product quality and strengthen its customer base in the country.

Source: Company Annual Reports, TechSci Research,
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PORTERS FIVE FORCES ANALYSIS
Chemicals

Porter's Five Forces Analysis

Competitive Rivalry
- Chemical industry is highly fragmented with intense rivalry amongst companies
- Since, 100 per cent FDI is allow hence domestic companies face stiff competition from foreign competitors as well
- International companies may also dump chemicals at low price

Threat of New Entrants
- Huge capital requirements and patent protection are significant barriers
- Other barriers include - R&D and personnel requirements

Substitute Products
- Buyers tend to have specific chemical requirements
- There are no direct substitutes for a specific chemical requirement

Bargaining Power of Suppliers
- Small chemical companies rely on supplies from larger plants, or petrochemical units
- Inputs for a chemical plant cannot be easily substituted

Bargaining Power of Customers
- Customers have multiple sources of supply
- Chemical companies are bound by long-term contracts
- Niche specialty chemicals have some pricing power

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GROWTH DRIVERS
GROWTH DRIVERS OF THE INDIAN CHEMICAL INDUSTRY

- Huge growth potential for the domestic market
- Rise in GDP and purchasing power
- World class engineering and strong R&D capabilities
- Big infrastructural investment
- Low-cost manufacturing
- Government policy support and increase in investment initiatives

Source: TechSci Research
ECONOMIC EXPANSION WOULD CONTINUE TO DRIVE GROWTH IN THE CHEMICAL INDUSTRY

- Being largely an intermediate product, strong economic growth is an important factor in sustaining demand for chemical products.
- Per capita consumption of most of the finished products under chemicals sector is far below the world average; this points to the vast potential for growth in the industry.
- As in a number of other industries in India, strong growth in discretionary income and changing lifestyles are counted as a few of the other major growth drivers of the chemicals sector.

Real GDP growth

Per capita GDP growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP Growth</th>
<th>Per capita GDP Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY06</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>FY07</td>
<td>9.8%</td>
<td></td>
</tr>
<tr>
<td>FY08</td>
<td>3.9%</td>
<td></td>
</tr>
<tr>
<td>FY09</td>
<td>8.5%</td>
<td></td>
</tr>
<tr>
<td>FY10</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>FY11</td>
<td>7.2%</td>
<td></td>
</tr>
<tr>
<td>FY12</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>FY13</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>FY14</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>FY15</td>
<td>6.6%</td>
<td></td>
</tr>
<tr>
<td>FY16</td>
<td>6.6%</td>
<td></td>
</tr>
<tr>
<td>FY17</td>
<td>7.70%</td>
<td>2.50%</td>
</tr>
</tbody>
</table>

Source: IMF, World Bank, TechSci Research

1 - Forecast

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FDI inflow in chemicals sector (other than fertilisers) stood at USD12.683 million during April 2000- December 2016, accounting for 4 per cent of the total inflows. Procedures relating to FDI have been simplified; most of the items in the chemicals sector fall under the automatic approval route for FDI/NRI/OCB investment up to 100 per cent.

In March 2017, H.B Fuller has opened a new office in Pune & a new R&D center at its manufacturing facility in Shirwal, concluding the 1st phase of US$20 million planned investment in India. The plant with a capacity of 24,000 metric tonnes per annum spans across 5000-sq. ft area. The company’s expansion would help them serve the customers better & to increase their footprint in India in industrial adhesives field.

In April 2017, Berger Paints India signed an MoU with Chugoku Marine Paints, a Japan-based company, with an aim to strengthen the cooperation and collaboration in the field of marine & related industrial paints. Under the MoU, the companies plan to establish a joint venture company for joint efforts in marketing, supply, purchasing marine related industrial paints.

Annual FDI inflow to the chemical industry (excluding fertilizer) (USD Million)

<table>
<thead>
<tr>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>2354</td>
<td>4041</td>
<td>292</td>
<td>878</td>
<td>10336</td>
<td>11900</td>
<td>12433</td>
</tr>
</tbody>
</table>

Share of chemical industry in total FDI inflow (excluding fertiliser)

<table>
<thead>
<tr>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.60%</td>
<td>11.30%</td>
<td>1.30%</td>
<td>4.44%</td>
<td>4.16%</td>
<td>4.12%</td>
</tr>
</tbody>
</table>

Source: Department of Industrial Policy & Promotion, Ministry of Commerce and Industry, TechSci Research
Note: (¹) - Up to September 2016
GOVERNMENT SUPPORT TO THE SECTOR IS INCREASING … (1/2)

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<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project based support to PSUs</td>
<td>29.1</td>
<td>4.3</td>
<td>0.0</td>
<td>5.4</td>
<td>1.3</td>
<td>5.81</td>
<td>2.30</td>
<td>6.11</td>
</tr>
<tr>
<td>Support to autonomous bodies</td>
<td>19.2</td>
<td>0.1</td>
<td>0.2</td>
<td>8.3</td>
<td>23.80</td>
<td>16.79</td>
<td>16.60</td>
<td>10.08</td>
</tr>
<tr>
<td>Other ongoing schemes</td>
<td>44.2</td>
<td>165.8</td>
<td>183.4</td>
<td>292.8</td>
<td>167.32</td>
<td>5.7</td>
<td>2.78</td>
<td>8.25</td>
</tr>
<tr>
<td>New schemes initiated in XI plan</td>
<td>25.0</td>
<td>17.9</td>
<td>10.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>117.5</strong></td>
<td><strong>188.1</strong></td>
<td><strong>193.7</strong></td>
<td><strong>306.5</strong></td>
<td><strong>224.7</strong></td>
<td><strong>28.3</strong></td>
<td><strong>21.68</strong></td>
<td><strong>24.44</strong></td>
</tr>
</tbody>
</table>

- In 2017, the government gave its approval to coal bed methane (CBM) contractors for selling the CBM in the domestic market. The contractors are also been permitted to sell the CBM to any of its affiliate in the event contractor cannot identify any buyer.

Source: Department of Chemicals and Petrochemicals, TechSci Research
Notes: (1) - Budget Estimate
GOVERNMENT SUPPORT TO THE SECTOR IS INCREASING … (2/2)

All figures are in USD million

<table>
<thead>
<tr>
<th>Name of the scheme</th>
<th>Non-plan outlay (FY10)</th>
<th>Non-plan outlay (FY11)</th>
<th>Non-plan outlay (FY12)</th>
<th>Non-plan outlay (FY13)</th>
<th>Non-plan outlay (FY14)</th>
<th>Non-plan outlay (FY15)</th>
<th>Non-plan outlay (FY16)</th>
<th>Non-plan outlay (FY17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam Gas Cracker Project</td>
<td>130.48</td>
<td>127</td>
<td>254.17</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0.0015</td>
<td></td>
</tr>
<tr>
<td>Secretariat</td>
<td>2.21</td>
<td>2.52</td>
<td>2.79</td>
<td>2.3</td>
<td>2.4</td>
<td>2.30</td>
<td>1.74</td>
<td>2.58</td>
</tr>
<tr>
<td>Central Institute of Plastics Engg. &amp; Technology (CIPET)</td>
<td>0.63</td>
<td>0.10</td>
<td>0.10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bhopal Gas Leak Disaster</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17.5</td>
<td>23.3</td>
<td>4.37</td>
<td>2.43</td>
<td>3.84</td>
</tr>
<tr>
<td>Institute of Pesticide Formulation Technology (IPFT)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
<td>0.6</td>
<td>0.59</td>
<td>38.11</td>
<td>0.0015</td>
</tr>
<tr>
<td>Others</td>
<td>0.50</td>
<td>0.54</td>
<td>0.63</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.77</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.34</strong></td>
<td><strong>133.64</strong></td>
<td><strong>130.52</strong></td>
<td><strong>274.57</strong></td>
<td><strong>42.3</strong></td>
<td><strong>7.26</strong></td>
<td><strong>46.05</strong></td>
<td><strong>6.42</strong></td>
</tr>
</tbody>
</table>

Source: Department of Chemicals and Petrochemicals, TechSci Research
Note: (1) - As on December 31, 2015,
(2) – Budget Estimate
The government has announced a number of measures to improve competitiveness in the sector.

Share of manufacturing approved by the Cabinet as per the erstwhile Planning Commission would contribute 25 per cent of the GDP by 2025.

Approval is granted for FDI up to 100 per cent in the chemicals sector, excise duty reduced from 14 per cent to 10 per cent, strong laws on anti-dumping to further promote the industry.

Cumulative FDI inflows into chemical industry reached USD 12,683.24 million during April 2000-December 2016.

Policies that have been initiated to set up integrated Petroleum, Chemicals & Petrochemicals Investment Regions (PCPIR) are revised by the end of 2015-2016. The land requirement for a PCPIR would go down from 250 square kilometers to 50 square kilometers.

The capital and technology intensive projects under PCPIR that are likely to be operational within 10-15 years are estimated to draw an investment of USD 116.54 billion.

For setting up of PCPIRs, the government approved states including Odisha (Paradip), Gujarat (Dahej), Tamil Nadu (Cuddalore-Nagapattinam) & Andhra Pradesh (Vishakhapatnam-Kakinada).

Industry-level initiatives

- The Indian Chemical Council (ICC) is the nodal agency/signatory representing India under the ‘Responsible Care Initiative’
- ICC has prepared codes and guidance for implementation of process safety, employee health and safety, pollution prevention, emergency response, and product safety
- Member companies of ICC are encouraged to interact with local communities and groups such as students, teachers, fire/police personnel

Firm-level initiatives

- Indian chemical firms have strived to increase their market share through global presence
- They have in place technical agreements with multinational firms to keep abreast of technological progress in the global chemical industry

Source: EXIM Bank of India, TechSci Research, Note: PCPIR - Petroleum, Chemicals and Petrochemicals Investment Regions
## MILESTONES PROPOSED FOR 12TH FIVE-YEAR PLAN

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Feedstock</th>
<th>R&amp;D and technology</th>
<th>Sustainability</th>
<th>Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Make PCPIRs a reality</td>
<td>• Implementation of strategy for sourcing &amp; allocation of feedstock</td>
<td>• Setting up of technology up-gradation fund of USD100 million</td>
<td>• Development of the 1st set of chemical usage standards for the industry addressing key issues related to water supply, environmental impact, raw materials supply, safety over lifecycle &amp; energy use</td>
<td>• Committee to frame regulatory structure &amp; eliminate redundancies</td>
</tr>
<tr>
<td>• Provide infrastructure support to the industry by constructing roads, ports &amp; other similar facilities</td>
<td></td>
<td>• Allocation of 10 per cent share of the USD1 billion National Innovation Fund to chemicals</td>
<td></td>
<td>• Setting up of a national chemical inventory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Setting up of technology up-gradation fund of USD100 million</td>
<td></td>
<td>• Government has rationalised and removed various tax exemptions and incentives to improve the administration &amp; to reduce tax disputes</td>
</tr>
</tbody>
</table>

Source: TechSci Research

Note: PCPIR - Petroleum, Chemicals and Petrochemicals Investment Regions
# RECENT MAJOR JVs and M&A DEALS IN THE INDIAN CHEMICAL INDUSTRY

<table>
<thead>
<tr>
<th>Acquirer</th>
<th>Target/ JV partner</th>
<th>Valuation</th>
<th>Synergies/ drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March-17</td>
<td>Bodal Chemicals</td>
<td>US$0.43</td>
<td>Specialty chemicals for water treatment &amp; swimming pools</td>
</tr>
<tr>
<td></td>
<td>Trion Chemicals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March-17</td>
<td>Du Pont</td>
<td>-</td>
<td>Industrial bio-sciences &amp; performance chemicals</td>
</tr>
<tr>
<td></td>
<td>Dow Chemicals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun-15</td>
<td>Evonik Industries</td>
<td>-</td>
<td>Global leader in catalysts</td>
</tr>
<tr>
<td></td>
<td>Monarch Catalyst Pvt. Ltd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April-14</td>
<td>Yanmar Ltd/ Mitsui Ltd</td>
<td>-</td>
<td>Manufactures rice transplanters &amp; harvesters</td>
</tr>
<tr>
<td></td>
<td>Coromandel International Ltd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April-14</td>
<td>Axiall LLC</td>
<td>USD6 million</td>
<td>Launched new-generation polymer compounds</td>
</tr>
<tr>
<td></td>
<td>Shriram Vinyl Polytech Pvt Ltd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December-13</td>
<td>Multiplast Polymer</td>
<td>-</td>
<td>Manufacturer of plastic products</td>
</tr>
<tr>
<td></td>
<td>Soft Clad Laminates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outbound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September-14</td>
<td>Brenntag</td>
<td>NA</td>
<td>Specialty chemicals</td>
</tr>
<tr>
<td></td>
<td>Pioma Chemicals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April-14</td>
<td>Asian Paints Ltd</td>
<td>-</td>
<td>Sells paints, coatings &amp; adhesives in Ethiopia</td>
</tr>
<tr>
<td></td>
<td>Kadisco Chemical Industry PLC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November-2016</td>
<td>The Chatterjee Group.</td>
<td>USD48 million</td>
<td>Purified terephthalic acid (PTA),</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Chemicals Corporation (MCC) PTA India</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* As of November 2016, Competition Commission approved the acquisition of Mitsubishi Chemicals Corporation (MCC) PTA India by Kolkata based - The Chatterjee Group.
* In February 2017, American automotive chemicals manufacturer - Penray & India's Automotive specialist - Talbros Gardx Performance Products, entered into a partnership, for marketing Penray’s chemical additives, functional fluids & car care products, pan India, using Talbros sales, marketing & distribution expertise.

Source: Department of Chemicals and Petro Chemicals, TechSci Research

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APRIL 2017
CHEMICALS

OPPORTUNITIES
GROWTH VALUE PROPOSITION OF THE INDIAN CHEMICAL INDUSTRY

- Critical size of the domestic market
- Customised application development
- Established process know-how and strong R&D capability
- Availability of reliable and competitive feedstock supply
- Indian chemicals sector

Source: KPMG International 2011, TechSci Research
**SPECIALTY CHEMICALS: LUCRATIVE OPPORTUNITIES IN THIS SEGMENT**

- Specialty chemicals market has expanded at a CAGR of about 12 per cent over FY07–11; the figure is expected to rise by 9.43 per cent from FY14 to reach USD90 billion by FY23, India is also gaining traction as an outsourcing hub
- The Indian middle-class household is expected to grow from 31 million in 2008 to 148 million by 2030, leading to a huge demand for specialty chemicals in automotives, water treatment & construction
- Compared to developed markets, current usage of specialty chemicals in India is very low, with an increased focus on improving products & usage intensity of specialty chemicals, the industry is poised for strong growth in future

### Specialty chemical growth outlook by FY23 (USD billion)

<table>
<thead>
<tr>
<th>Year</th>
<th>FY14</th>
<th>FY20F</th>
<th>FY23E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paints and Coatings</td>
<td>40</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Speciality Polymers</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Construction Chemicals</td>
<td>0.6</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Textile Chemicals</td>
<td>0.8</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Water Chemicals</td>
<td>0.6</td>
<td>1.1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**CAGR: 9.43 per cent**

Source: FICCI, Dept. of Chemicals and Petrochemicals, TechSci Research

Notes:
1. Value is for 2014
2. Value is for 2015

E: Estimated Value

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Within Specialty Chemicals, Construction Chemicals is Likely to Shine

- India’s construction chemical market stood at USD 573.2 million in 2014, which grew to USD 649.75 million in 2015.
- With the construction sector expected to pace ahead due to strong economic growth, the fundamentals for construction chemicals are sound.
- By 2019, the construction chemicals sector is set to touch USD 1146.4 million.
- India’s construction chemical sector consists of a variety of products ranging from admixtures to sealants. Admixtures form the largest segment with a 42 per cent share, followed by 18 per cent share of adhesives & sealants.

Construction chemical growth outlook (USD million)

Source: FICCI, TechSci Research
Note: E-Estimate
Key growth drivers of specialty chemicals

Water treatment chemicals are widely used in purification of water & also in large power plants, refineries & fertiliser factories.

Automotive sector in India has been expanding at a CAGR of ~12 per cent over the last 5 years. Automotive sector growth will drive demand for automotive components & consequently for plastics, paints & coatings used in their production.

Source: TechSci Research
Polymer chemicals

* India is currently the world’s third largest consumer of polymers, behind China and the US. India’s polymer consumption is 6.2 million tonnes which constitutes 3 percent of the global consumption.
* Per capita consumption of polymer in India is 5.2 kg whereas China’s per capita polymer consumption is 30 kg.
* Indian Polymer market has grown at a CAGR of 23.02 per cent over 2005-15 to USD1310 million.
* The sector is expected to grow at a higher rate due to growth in plastic demand resulting from increased usage in packaging, construction and automotive sectors.
* Due to increasing environmental concerns and cost, replacement of wood, metal and glass by plastic will also augment demand.
* Polymer production in India is around 9 million tonnes & imports stand at 2.8 million tonnes.
* In FY 16(1), polymer production in India is stood at around 3.75 million tonnes, witnessing Y-o-Y growth at a rate of 17.9 per cent, over the previous year.

Source: TATA Strategic Analysis, TechSci Research
Notes: E - Estimates, CAGR - Compound Annual Growth Rate,
(1) – As of April 15 – September 15)
AGROCHEMICALS: THE FUTURE LOOKS BRIGHT… (1/2)

* India is the 3rd largest producer of agrochemicals, globally & ranks 4th in terms of production of crop protection chemicals. The market for crop protection chemicals in India is expected to reach to USD7.5 billion by FY19 & register exports of about 50 per cent of value of Indian crop protection industry.

* Agrochemical industry in India is set to grow at a significant pace; increasing population, decreasing per capita availability of arable land & focus on increasing agricultural yield will fuel the demand for agrochemicals.

* India’s per hectare agrochemical consumption is set to rise in the coming years, given the above-mentioned factors.

* In 2015, India has become one of the largest exporters of agrochemicals globally.

* Insecticides India Ltd launched a mobile app for its customers, to provide them important updates and information about products offered by the company. Insecticides India Ltd, a leading agrochemical company plans to invest USD22.9 million in the next 2 years to expand its production capacity.

* Insecticides India, an agrochemical company collaborated with Japanese firm - Nihon Nohyaku Co. Ltd., to launch new generation insecticides in the market."
The 7 states including Andhra Pradesh (AP), Maharashtra, Punjab, Madhya Pradesh & Chhattisgarh, Gujarat, Tamil Nadu & Haryana account for usage of over 70 per cent crop protection chemicals in India; wherein Andhra Pradesh is a leading consumer of agrochemicals with a market share of 24 per cent.

Exports of Agrochemicals in India (USD Billion)

State Wise Agrochemical Consumption in 2015

Source: FICCI, TechSci Research
Note: F-Forecast, AP – Andhra Pradesh, MP – Madhya Pradesh
(1) - Provisional data
TATA CHEMICALS: DIVERSIFYING THEIR WAY TO SUCCESS … (1/3)

Tata Chemicals Limited (TCL) is one of the leading chemical companies in India, with significant operations in India and Africa.

Second-largest soda ash producer in the world and the largest in India.

A market leader in edible salt; largest STPP player in the country.

Most energy-efficient urea fertiliser manufacturer in India; amongst the most efficient globally.

1/3rd stake holder in IMACID, Morocco, assured supply of key inputs.

As of 2016, Soda Ash market holds the maximum share of 38 per cent followed by Complex Fertilizers and Urea with 21 per cent and 13 per cent respectively; Soda ash market in India saw a growth of 10 per cent during the period 2014-15.

Revenue breakup of Tata Chemicals (FY16)

Source: Company Annual Report, TechSci Research
Notes: STPP (1) - Sodium Tripolyphosphate
IMACID - Indo Maroc Phosphore S.A.
CHEMICALS

TATA CHEMICALS: DIVERSIFYING THEIR WAY TO SUCCESS … (2/3)

- 2009: Acquires controlling stake in Rallis India Limited
- 2010: Acquires South Africa’s Grown Energy
- 2011: Tata Chemicals Europe Ltd acquires British Salt, producing approximately half of the UK’s pure salt
- 2012: India’s first iodine plus iron fortified salt launched by Tata Chemicals
- 2013: Tata Chemicals wins two awards at the Brand Leadership Award 2013 for ‘Emerging Brand’ and ‘50 Most Talented Brand Leaders of India’
- 2014-15: Tata Chemicals was awarded ‘Dun & Bradstreet Corporate Awards 2015’ in the fertilizer’s sector
- 2015-16: Tata Chemicals announced the launch of a new brand “Tata Sampann for providing quality food products
- 2016: Tata Chemicals was awarded India’s Best Employer Award 2016, by Aon
- Tata Chemicals in 2016 launched crop nutrition product “Tata Paras Farmoola Foliar” for apple crop production.

Source: Company website, TechSci Research
TATA CHEMICALS: DIVERSIFYING THEIR WAY TO SUCCESS … (3/3)

Geographical diversification (FY16)

- Asia: 72%
- America: 9%
- Europe: 14%
- Africa: 2%
- Others: 3%

Turnover over the years (USD billion)

- FY08: 1.5
- FY09: 2
- FY10: 2.4
- FY11: 2.9
- FY12: 2.8
- FY13: 2.6
- FY14: 2.8
- FY15: 2.8
- FY16: 2.7

CAGR: 9.55%

* Tata Chemicals Limited (TCL) earned net profit of USD119.18 million in FY16

Source: Tata Chemicals Annual Report, TechSci Research
Note: Data upto 31st March, 2016

For updated information, please visit www.ibef.org
UPL is mainly engaged in the business of agrochemicals, other industrial chemicals, and chemical intermediates.

Agrochemicals account for 96 per cent of the total sales of the company, while the industrial chemicals and intermediates segments together account for 4 per cent.

UPL has 28 manufacturing sites – 13 in India and 15 outside India (international).

The company has also strengthened its distribution reach and access to new markets through strategic alliances with agrochemical manufacturers in other countries.

The company is planning to launch innovative technology, farming solutions, and new products through its other arms such as Advanta and Golden Seeds.

UPL has been ranked the fifth largest agrochemical company globally.

Source: United Phosphorus Limited (UPL) Annual Reports, TechSci Research
Notes: CAGR - Compound Annual Growth Rate
**CHEMICALS**

**UNITED PHOSPHORUS LIMITED (UPL): AN AGROCHEMICAL SUCCESS … (2/2)**

- UPL Limited comprises of UPL, Advanta and UEL companies that are listed in the Indian Stock Exchange
- In 2015, UPL Mumbai won the Dun & Bradstreet Corporate Award in the agrochemicals sector

**Income by region - FY16**

- India: 27 per cent
- Latin America: 14 per cent
- North America: 15 per cent
- Europe: 19 per cent
- Rest of World: 25 per cent

**EBIDTA (USD billion)**

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>EBIDTA (USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY08</td>
<td>0.18</td>
</tr>
<tr>
<td>FY09</td>
<td>0.21</td>
</tr>
<tr>
<td>FY10</td>
<td>0.22</td>
</tr>
<tr>
<td>FY11</td>
<td>0.26</td>
</tr>
<tr>
<td>FY12</td>
<td>0.31</td>
</tr>
<tr>
<td>FY13</td>
<td>0.32</td>
</tr>
<tr>
<td>FY14</td>
<td>0.36</td>
</tr>
<tr>
<td>FY15</td>
<td>0.39</td>
</tr>
<tr>
<td>FY16</td>
<td>0.15</td>
</tr>
</tbody>
</table>

**CAGR: 11.7%**

**Source:** Company Annual report, TechSci Research

**Notes:** EBIDTA - Earnings Before Interest, Taxes, Depreciation and Amortisation
ASIAN PAINTS: A COLORFUL GROWTH PATH

* In 1942, Asian Paints started manufacturing in a Mumbai garage; now, with total installed capacity of nearly 1 million kilo-litre, Asian Paints is amongst the largest paint manufacturing companies in the world

* Asian Paints has grown at an excellent pace over the years; a CAGR of 13.27 per cent from FY09–15 and net profit after tax earned for FY16 (during April – September 2015) is at USD144.4 million

* In 2015, Asian Paints was awarded as the “Most Impactful Companies of the Decade” by CNBC. The company was listed on India’s Super 50 companies in the July 2015 issue by Forbes India

Asian Paints geography wise sales (FY16)

- Middle East & Africa (Egypt, Oman, Bahrain, UAE & Ethiopia)
- Asia (Bangladesh, Nepal, Sri Lanka, Singapore & Indonesia)
- Caribbean (Barbados, Jamaica, Trinidad & Tobago)
- South Pacific (Fiji, Solomon Islands, Samoa, Tonga & Vanuatu)

Asian Paints Revenue (USD million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (USD million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 09</td>
<td>1100</td>
</tr>
<tr>
<td>FY 10</td>
<td>1200</td>
</tr>
<tr>
<td>FY 11</td>
<td>1600</td>
</tr>
<tr>
<td>FY 12</td>
<td>1900</td>
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<tr>
<td>FY 13</td>
<td>2000</td>
</tr>
<tr>
<td>FY 14</td>
<td>2100</td>
</tr>
<tr>
<td>FY 15</td>
<td>2322.9</td>
</tr>
<tr>
<td>FY 16</td>
<td>2342</td>
</tr>
</tbody>
</table>

Source: Company Annual report, TechSci Research
Notes: KL - Kilo Litre, CAGR - Compound Annual Growth Rate

For updated information, please visit www.ibef.org
Established in 1983, India Glycols is the only company that manufactures green technology-based bulk, specialty and performance chemicals and natural gums, spirits, industrial gases, sugar and nutraceuticals in India.

The company operates in five segments, including Chemicals which forms the largest segment.

The company exports to more than 40 countries including the US, Japan, and countries in Europe and Latin America.

During FY09–16, the company’s sales have increased at a CAGR of 7.84 per cent to USD380.9 million.

The company registered a sales of USD380.9 million in FY16 against sales of USD418.8 million in FY15.

Source: Company Annual Report, TechSci Research
Notes: CAGR - Compound Annual Growth Rate, TTM – Trailing Twelve Months
Indian Chemical Council
Sir Vithaldas Chambers, 16-Mumbai Samachar Marg,
Mumbai – 400023
Phone: 91 22 22047649/ 22846852
Fax: 91 22 22048057
Website: www.icmaindia.com

Alkali Manufacturers Association of India
3rd Floor, Pankaj Chambers, Preet Vihar Commercial Complex,
Vikas Marg, New Delhi – 110092
Phone: 91 11 22432003, 22410150, 55253401
Fax: 91 11 22468249
Website: www.ama-india.org

Indian Specialty Chemical Manufacturers' Association
1156, Bole Smruti, Suryavanshi Kshatriya Sabhagriha Marg,
Off. Veer Savarkar Marg, Dadar (West)
Mumbai – 400 028
Tel: 91 22 2446 5003
Website: www.iscma.in
**GLOSSARY**

- **OCB**: Overseas Corporate Bodies
- **NRI**: Non-Resident Indian
- **FY**: Indian Financial Year (April to March)
  - So FY10 implies April 2009 to March 2010
- **NA**: Not Available
- **STPP**: Sodium Tripolyphosphate
- **MT**: Metric Tonnes
- **USD**: US Dollar
- Wherever applicable, numbers have been rounded off to the nearest whole number
## CHEMICALS

## EXCHANGE RATES

### Exchange rates (Fiscal Year)

<table>
<thead>
<tr>
<th>Year</th>
<th>INR equivalent of one USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004–05</td>
<td>44.81</td>
</tr>
<tr>
<td>2005–06</td>
<td>44.14</td>
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<tr>
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<td>2007–08</td>
<td>40.27</td>
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<td>2014–15</td>
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<tr>
<td>2015–16</td>
<td>65.46</td>
</tr>
<tr>
<td>2016-2017E</td>
<td>66.95</td>
</tr>
</tbody>
</table>

### Exchange rates (Calendar Year)

<table>
<thead>
<tr>
<th>Year</th>
<th>INR equivalent of one USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>43.98</td>
</tr>
<tr>
<td>2006</td>
<td>45.18</td>
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<td>2007</td>
<td>41.34</td>
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<td>2014</td>
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<td>2015</td>
<td>64.15</td>
</tr>
<tr>
<td>2016 (Expected)</td>
<td>67.22</td>
</tr>
</tbody>
</table>

Source: Reserve Bank of India, Average for the year

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