

# Inorganic Chemicals

MARKET & OPPORTUNITIES





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# Introduction

The global chemicals industry, estimated at US\$ 2.4 trillion, is one of the fastest growing sectors of the manufacturing industry. The industry growth exceeds that of the manufacturing sector, despite the challenges of escalating crude oil prices and demanding international environmental protection standards which are now adopted globally.

Pharmaceuticals and petrochemicals are the two biggest segments in chemicals, that account for approximately 26 per cent and 35 per cent respectively of the overall industry size. Europe, is the largest consumer of chemicals in the world, accounting for approximately half the global chemical consumption, USA consumes approximately one-fifth.

The global chemicals industry is being shaped by the following trends that are impacting business models, processes and product segments of multinational players.

- Globalisation: The global manufacturing footprint of MNCs is getting transformed, as companies seek to gain proximity to consumer markets, raw material sources, cheaper energy sources and lower tax regime in an effort to drive down costs and safeguard profitability.
- Consolidation: Mergers and acquisitions are increasingly prevalent and companies seek economies of scale in manufacturing, logistics and R&D and to pave entry into new markets, expanding the global reach.
- Increased environment consciousness: This is a global phenomenon, that is driving the industry to innovate and modernise. Effluent disposal issues have resulted in research into cogeneration and upgradation of technology, having a healthy impact on costs and profitability.

# Indian Chemical Industry

## A SIGNIFICANT SECTOR IN INDIA'S ECONOMY

Indian chemicals industry, which includes basic chemicals & its products, petrochemicals, fertilisers, paints, gases and pharmaceuticals, is one of the oldest industries in the country and plays an important role in its overall economic development. Other features that set it apart, are the requirement for large capital for set-up, high power consumption for production and a highly diversified product range, covering more than 70,000 commercial products. The chemical industry forms the backbone of the industrial and agricultural development of India, by providing building blocks for downstream industries.

The chemical industry accounts for about 17.6 per cent of the output of India's manufacturing sector and about 3 per cent of the GDP. The industry output is estimated at US\$ 35 billion, with a total investment of approximately US\$ 60 billion.

The Indian chemical industry is the 12th largest in the world and 3rd largest in Asia, in terms of volume. It accounts for about 13 per cent of total exports and 8 per cent of the total imports of India. During the last 5 years, exports of chemicals have exceeded imports thereby resulting in a positive balance of trade, as against negative balance in the nineties. The industry contributes about 18-20 per cent of total customs and excise duties collection in India.

India's current per capita consumption of chemicals is just a tenth of the world's average, indicating the tremendous scope for industry's growth in India. The industry size is projected to more than double, to reach US\$ 80 – 100 billion by 2010.

## INDUSTRY STRUCTURE AND SEGMENTATION

The industry is highly fragmented, with close to 7000 firms developing multiple products at dispersed locations. Western India accounts for half of the total Indian chemical industry.

Concentration of the Chemical Industry	
Gujarat	53%
Maharashtra	9%
Uttar Pradesh	6%
Tamil Nadu	6%
Madhya Pradesh	5%
Punjab	4%
Others	17%

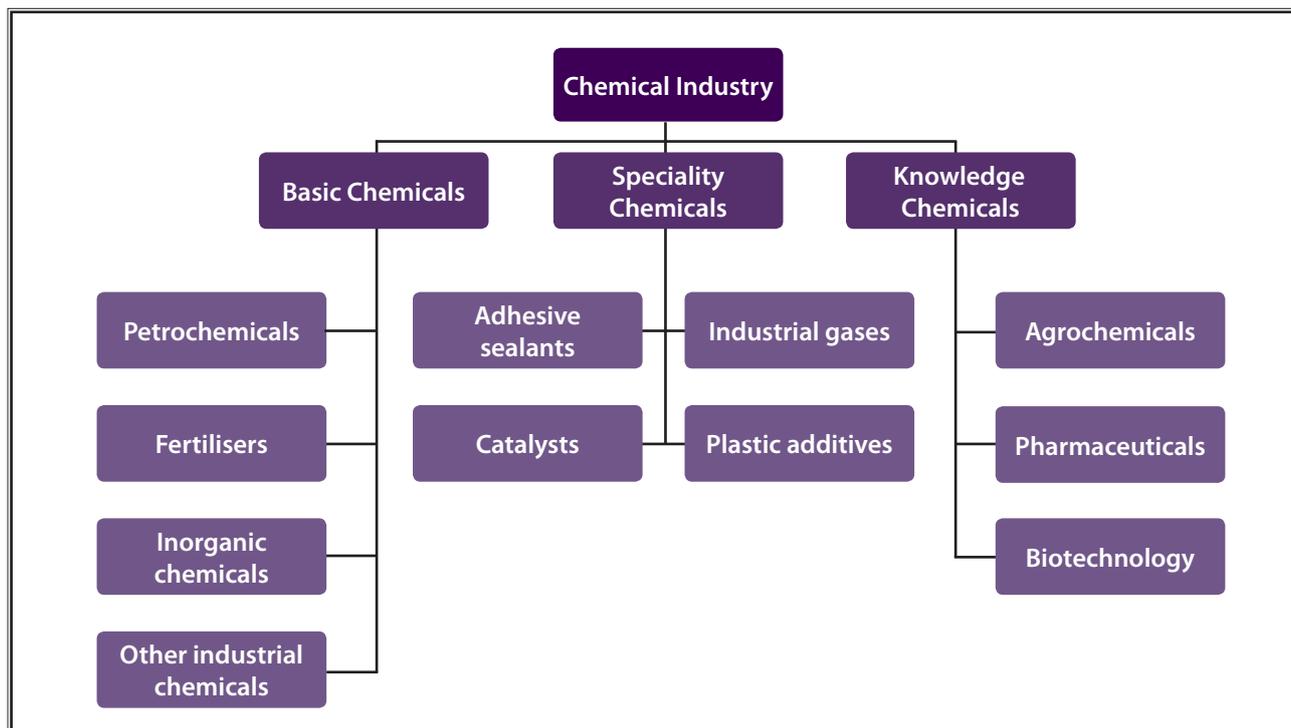
## Industry Segmentation

The chemicals industry, is broadly classified into basic chemicals, speciality chemicals and knowledge chemicals. Basic chemicals have traditionally formed the bulk of the chemicals industry in India and still account for 57 per cent of the output. The industry is now evolving and developing with higher investments in R&D. As a result, knowledge chemicals and specialty chemicals have grown and today occupy nearly 43 per cent of the industry.

Composition of Indian Chemical Industry	
Basic Chemicals	57%
Speciality Chemicals	26%
Knowledge Chemicals	17%

Source: KPMG, Chemtech Report, 2003

These categories can be further divided into different groups. Inorganic chemicals come under the basic chemicals category.



## INDIAN INORGANIC CHEMICALS INDUSTRY

Inorganic chemicals are those, that are not carbon based. Typically, they are of mineral origin. The chemicals produced by this industry are intermediate products, that are used as inputs in industrial and manufacturing processes.

The inorganic chemicals industry consists of two segments—basic inorganic chemicals and alkaline chemicals. The chemicals in each segment are:

### *Basic Inorganic Chemicals*

- Aluminium Fluoride
- Calcium Carbide
- Carbon Black
- Potassium Chlorate
- Sodium Chlorate
- Titanium Dioxide
- Red Phosphorus

### *Alkali chemicals*

- Soda Ash
- Caustic Soda
- Liquid Chlorine

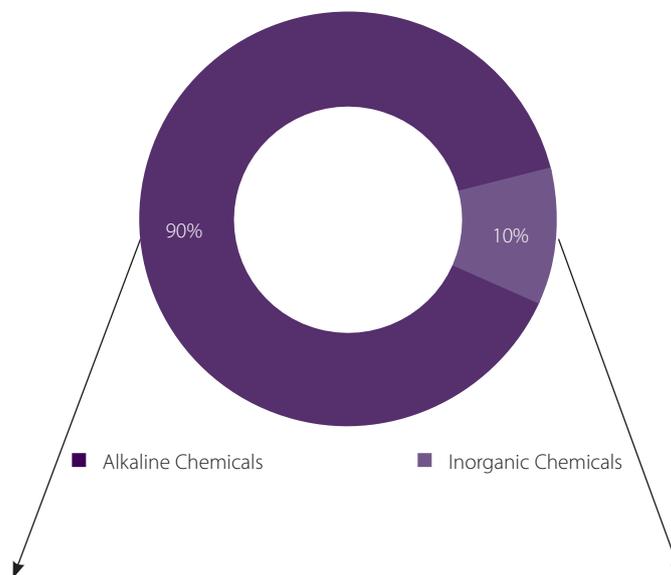
## MARKET SIZE

The inorganic chemicals industry had an output of approximately 5.8 million tonnes in 2006-07. Of this, alkaline chemicals contributed 5.26 million tonnes, or nearly 90 per cent and basic inorganic chemicals contributed 0.6 million tonnes.

Among alkaline chemicals, soda ash is the largest segment, contributing to 40 per cent of the output caustic soda has a 36 per cent share and liquid chlorine has 24 per cent.

Carbon black, is the biggest segment in basic inorganic chemicals, with a share of nearly 71 per cent of the output. Calcium carbide with 16 per cent and titanium dioxide with 10 per cent, are the other significant segments.

Inorganic Chemicals Industry Share of Production (2006-07)



Alkaline Chemicals Segment - Share of production (2006-07)	
Soda Ash	40%
Caustic Soda	36%
Liquid Chlorine	24%

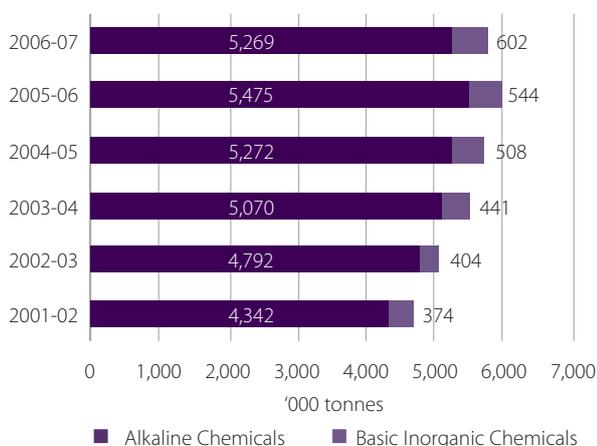
Basic Inorganic Chemicals Industry - Share of Production (2006-07)	
Carbon Black	71%
Calcium Carbide	15%
Titanium Dioxide	10%
Aluminium Floride	3%
Others	1%

**DOMESTIC PRODUCTION OF INORGANIC CHEMICALS HAS BEEN GROWING**

Production of inorganic chemicals has been growing at a CAGR of 4.4 per cent between FY' 2002 and FY 2007. The output has gone up from 4.7 million tonnes in 2001-02 to

have grown at a CAGR of 10 per cent, from 374,000 tonnes to 602,000 tonnes. As a result of faster growth, the share of basic inorganic chemicals has gone up, from 8 per cent to 10 per cent.

Production of Inorganic Chemicals



Source: Department of Chemicals & Petrochemicals

5.9 million tonnes in 2006-07. Alkaline chemicals have grown at a CAGR on 3.9 per cent, from 4.34 million tonnes to 5.26 million tonnes during this period. Basic inorganic chemicals

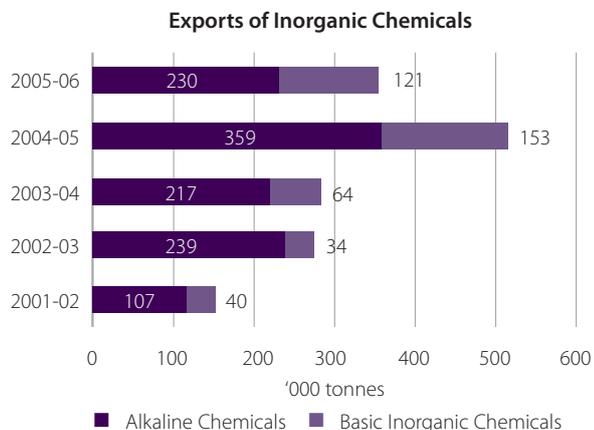
**THERE HAS BEEN RAPID INCREASE IN EXPORTS AND IMPORTS**

Imports of inorganic chemicals into India have gone up, from 256,000 tonnes in 2001-02 to 842,000 tonnes in 2005-06, at a CAGR 34.7 per cent. Alkaline chemicals have grown at 36.8 per cent CAGR and basic inorganic chemicals have grown at 25.4 per cent CAGR.

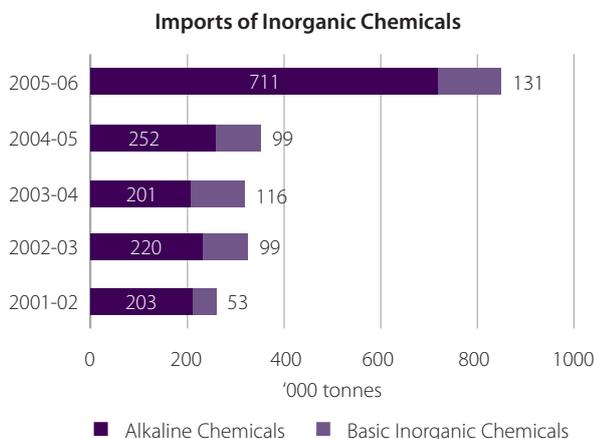
There was a sudden growth in alkali chemicals imports in 2005-06, which was contributed by a spurt in imports of soda ash.

Exports have followed a similar trend, with a growth of 24.2 per cent CAGR between FY'02 and FY'06. Basic inorganic chemicals have grown at 31.4 per cent CAGR and alkaline chemicals, at 21.1 per cent CAGR, during the period.

There was a spurt in inorganic chemical exports in 2004-05, mainly due to increase in exports of carbon black, titanium dioxide and aluminium fluoride.



The industry is reaching capacity saturation levels in some of the key segments, which indicates that imports could increase further unless capacity is added urgently. The capacity utilisation across different segments in 2006-07 are given in the table – Carbon black, soda ash and caustic soda are approaching full capacity utilisation levels.

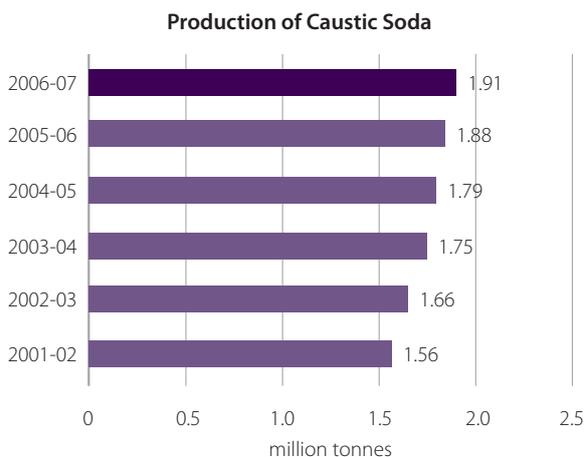


Chemical	Capacity Utilisation (2006-07)
Carbon Black	93%
Soda Ash	88%
Caustic Soda	87%
Liquid Chlorine	80%
Aluminium Fluoride	75%
Calcium Carbide	61%
Titanium Dioxide	58%

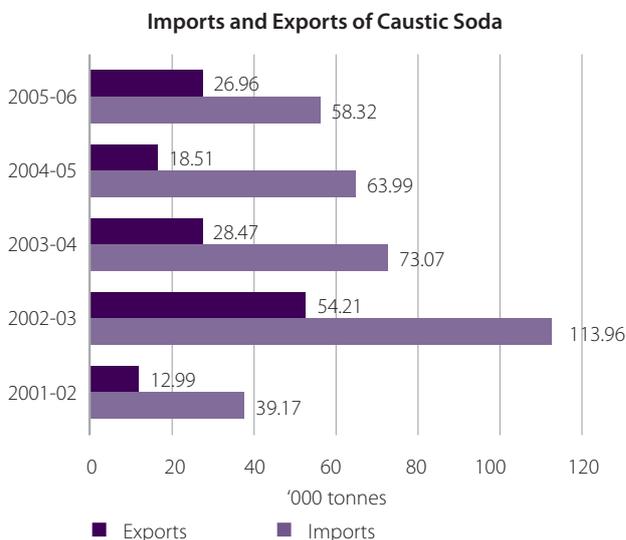
### KEY PRODUCT SEGMENTS

#### Caustic Soda

Production of caustic soda has been increasing at a CAGR of 4.9 per cent, from 1.56 million tonnes in 2001-02 to 1.91 million tonnes in 2006-07. Imports have been declining over the past 4 years, after a sudden increase in 2002-03. Exports have had a fluctuating trend.



Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI



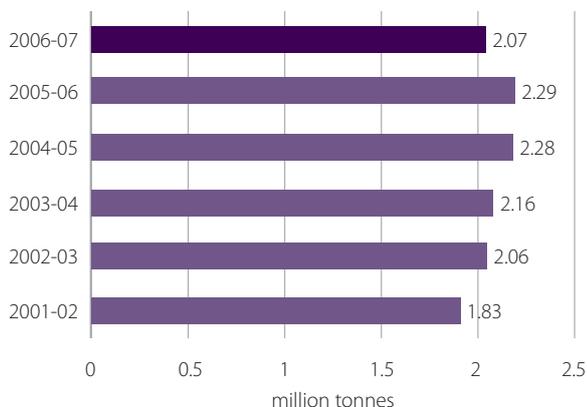
Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI

There are about 40 manufacturers of caustic soda in India. Caustic soda, finds use in various applications, such as, finishing operations in textiles, manufacture of soaps and detergents, control of pH (softening) of water for various applications and general cleansing / bleaching applications. As such, demand for caustic soda is driven by user industries such as, FMCG, textiles, food processing, paper and pulp, etc.

### SODA ASH

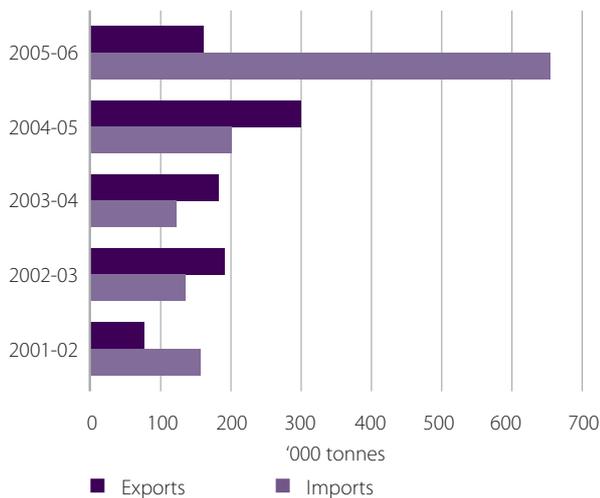
Soda ash production in India has been growing at 2.5 per cent CAGR from 1.83 million tonnes in 2001-02 to 2.08 million tonnes in 2006-07. Imports have grown at 41.3 per cent CAGR between FY'02 and FY'06, largely due to a jump of 350 per cent between 2004-05 and 2005-06. Exports have more than doubled between FY'02 and FY'06, from 87,000 tonnes to 197,000 tonnes.

Production of Soda Ash



Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI

Imports and Exports of Soda Ash



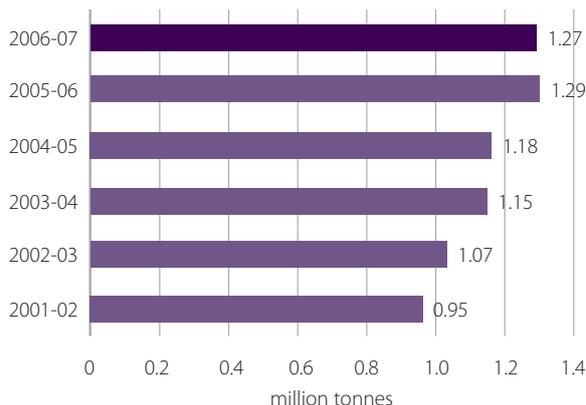
Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI

Glass manufacturing is the largest application for soda ash whether it is in the production of containers, fiberglass insulation or flat glass for the housing, commercial building, and automotive industries. Soda ash also is used to clean the air and soften water. Household detergents and paper products are a few other common examples of readily identifiable products using soda ash.

### LIQUID CHLORINE

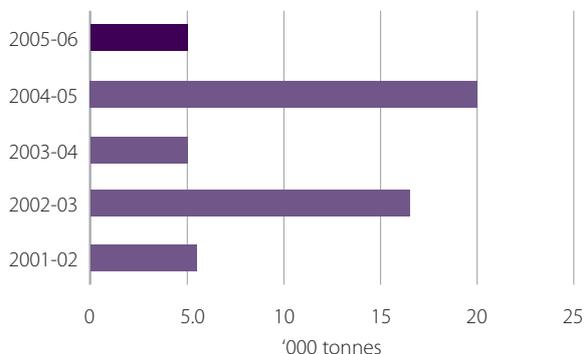
Liquid chlorine production in India has been growing at 6.1 per cent CAGR, from 0.9 million tonnes in 2001-02 to 1.27 million tonnes in 2006-07. Imports have been negligible, and exports have fluctuated widely over the past 5 years.

Production of Liquid Chlorine



Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI

Exports of Liquid Chlorine



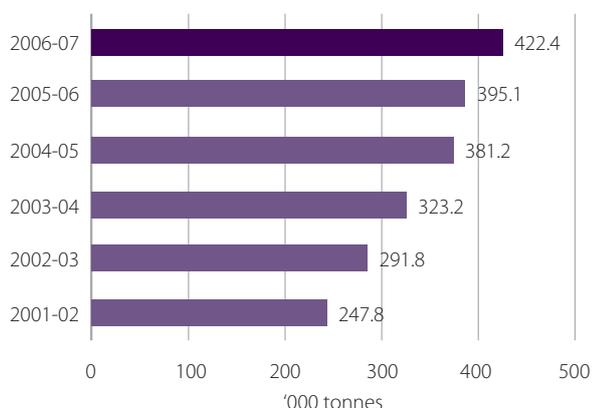
Source: Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, GoI

Liquid chlorine is used primarily for various bleaching applications, across paper and pulp, textiles and other industries.

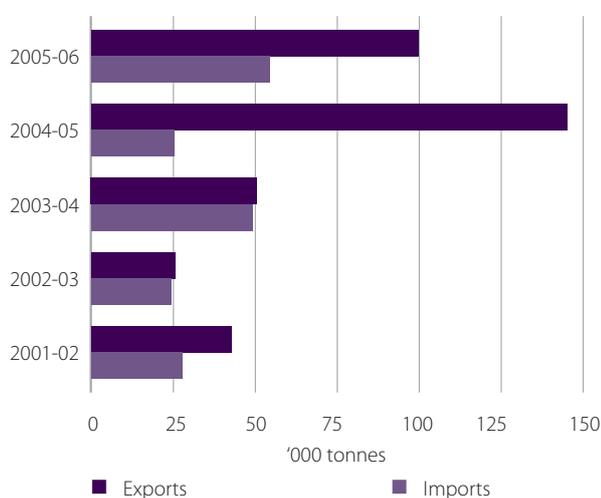
### CARBON BLACK

Carbon black production has grown from 248,000 tonnes in 2001-02 to 422,000 tonnes in 2006-07, a CAGR of 11.2 per cent. The sector has a capacity of 455,000 tonnes. Both imports and exports have been increasing, imports from 16,300 tonnes in FY'02 to 55,300 tonnes in FY'06, at a CAGR of 35.6 per cent and exports from 36,900 tonnes in FY'02 to 97,000 tonnes in FY'06, at 27 per cent CAGR.

Production of Carbon Black



Imports and Exports of Carbon Black



The most widespread use of carbon black is as a pigment in the manufacture of automotive tyres, industrial rubber, plastics and toners for printers.

### KEY USER INDUSTRIES

The inorganic chemicals industry produces intermediate products, that are used as inputs for several user industries. Hence, the demand for chemicals will depend on the demand for the products in whose production they are used. In this context, it is pertinent to look at some of the key user segments for inorganic chemicals and assess the potential demand for those products. Five major segments are discussed here paints, glass, automotive, paper and detergents/soaps.

### PAINTS INDUSTRY

The Indian paint industry, is divided into two segments decorative and industrial. The market is highly fragmented, with 25 large and medium players and about 2,000 unorganised players. Asian Paints is the market leader in the industry, with a market share of 37 per cent, followed by Kansai Nerolac and Berger Paints, both accounting for 18 per cent and 15 per cent, respectively. The paint industry has shown a compounded annual rate of growth (CAGR) of 28 per cent over the past five years.

The continued growth in the demand from the housing sector, backed by low home finance rates, augurs well for the decorative segment. The household construction industry is expected to grow at 8 per cent in the next five years. Demand will be generated through the new constructions, coming in housing and industries. The decorative segment, spurred by these trends, is expected to grow at CAGR of 30-32 per cent over the next couple of years.

The automobile sector, accounts for the lion's share of industrial paints demand. The growing demand in consumer durables is expected to improve the demand in powder coatings. Overall, the industrial paints segment is expected to grow at 18-20 per cent in the coming years.

### GLASS INDUSTRY

The glass industry in India manufactures almost a complete range of glass items. Glass products are manufactured both in the organised and small-scale sector and the major segment of tiny and small-scale sector is concentrated in Ferozabad, Uttar Pradesh. However, the large units are spread over throughout the country.

The Indian glass industry has been growing across all segments. Sheet and Float glass have recorded the fastest growth at nearly 67 per cent CAGR between 2001 and 2005. This growth has been driven primarily by India's booming automotive and construction sectors. Other glassware such as bottles and fiberglass have recorded more modest growth rates, of about 5 to 6 per cent CAGR over the same period.

Exports of glassware from India have been growing at a rate of 17 per cent CAGR over the period 2001-02 to 2006-07. From a level of US\$ 139 million in 2001, exports have increased to US\$ 307 million by 2007.

## AUTOMOTIVE INDUSTRY

The Indian automotive market has been one of the key drivers of the economy. The domestic market has been growing at 14 per cent CAGR from FY'02 to FY'07. All segments of the vehicles market are growing. Exports of vehicles have been growing at over 40 per cent CAGR during the same period. Growth in vehicle sales has been complemented by that in auto components. The components sector has been growing at 22 per cent CAGR and components exports at 33 per cent CAGR over FY '02 to FY'07.

Growth in the automotive industry is based on several fundamental and long lasting changes in the Indian economy the primary drivers being:

- Growth in GDP of close to 8 per cent a year, which is expected to be stabilise.
- Shift in demographics – rising income levels, emergence of young consumers and increasing consumerism.
- Improvement in road infrastructure.
- Increasing availability of vehicle financing.

Based on these drivers, the growth in automobiles is expected to continue at almost the same pace over the coming years.

## PAPER INDUSTRY

An improvement in the standard of living of Indians, especially, in urban areas has resulted in a gradual shift towards better quality of papers, hence increasing the demand of high-end varieties of paper. Further, with rising exports and keeping in view the current trend of outsourcing, foreign publishers have started outsourcing printing and publishing jobs to India. This will significantly increase the demand for different varieties of paper.

## DETERGENTS/SOAPS INDUSTRY

The soaps and detergents industry include laundry soaps, synthetic detergents, and toilet soaps including bathing bars. The production of soap during 2005-2006 was 4, 86,533 tonnes and detergents was 9, 28,222 tonnes. The export and import of soaps during 2005-06 was 15,344 tonnes and 35,579 tonnes. The export and import of detergents during 2005-06 was 32,342.02 tonnes and 20,547 tonnes, respectively.

## GOVERNMENT POLICIES SUPPORTING THE INDUSTRY

With the chemical industry now having reached a stage of maturity, this sector has been to a large extent de-regulated. Licensing requirements have also been done away with, except for hazardous chemicals and a few specified drugs.

- Entrepreneurs are allowed to set up chemical industries following the Industrial Entrepreneurs' Memorandum (IEM) route
- Tariff levels have been reduced substantially for most chemicals and petrochemical products and majority of the chemical items can now be freely imported or exported through simplified procedures
- 100 per cent FDI under the automatic route is allowed for all chemical items except hazardous chemicals, where Government/FIPB approval and license to manufacture are required
- Plans are underway to set up port based chemical parks in SEZs, to encourage clustering, provide infrastructure and enable tax concessions
- Downstream SEZs have been planned, to use the output of Chemical Parks

## POTENTIAL LOCATIONS FOR INVESTMENT

Access to raw materials and power are key requirements for the chemicals sector. Most of the key chemicals manufacturing units in India have been clustered in Western India, in the states of Gujarat and Maharashtra. As these states, also have among the best infrastructure facilities in India and provide easy access to major ports, these form the most attractive locations for the chemicals industry. Andhra Pradesh is another potential location, as it has a flourishing chemicals industry base as well.

### Gujarat

#### Factor Conditions

- Proactive policies of the government and capability driven are supporting factors for driving this industry.
- The state accounts for 34.5 per cent of the total sales by industries.
- The state has accounted for investments worth US\$ 32.57 billion in this sector, aggregating 50.3 per cent of the total

investment from 1991.

- The states SSIs have had impressive performance.
- The state has vast reserves of limestone, bauxite and natural gas, which has enabled the mineral-based industry to flourish.
- The state boasts of abundant raw-material, good infrastructure and skilled man-power.
- The exports of chemicals have accounted for 30 per cent of the total exports for the year 2002-03.
- In the past, international firms have investment in the state in the chemicals segment.
- The state offers quality manpower, good infrastructure facilities such as, power, water supply, ports and gas grid.

### **Andhra Pradesh**

#### **Factor Conditions**

- The state has high literacy rates and the presence of good vocational training institutions have ensured that the state has well qualified manpower.
- Proactive policies along with capabilities have made the state attractive in the chemicals and pharmaceuticals industry.
- The state derives close to around 40 per cent of its revenues from the chemicals sector. This industry is growing at a healthy rate, when compared to other sectors in the state.
- Majority of the FDI's in the state has been in chemicals & petrochemicals sector (as on Feb. 2004).
- The state supports the chemical industry with excellent research institutes.
- The contribution of exports by drugs & pharmaceuticals, chemicals & allied products has been 17.8 per cent during the year 2002-03.

### **Maharashtra**

#### **Factor Conditions**

- Chemicals, petrochemicals, oil & gas contributes around 44 per cent of the total NVA (Net Value Added).
- The state contributes 27.4 per cent of the country's chemicals, petrochemicals and oil & gas output.
- The state accounts for 18.2 per cent of the country's employment in the sector.
- The chemical industry is expected to grow 15 per cent per annum till 2010 and thus, presents ample opportunities for the state.
- The pharmaceuticals sector accounts for 40 per cent of country's output.
- The upstream and downstream linkages for the industry are the strongest in the state.
- 12 per cent of the total exports have been contributed by the chemicals and petroleum crude for the year 2002.
- This industry has received the major chunk of investments in the past. It contributes to around 30 per cent of investments, as per the annual survey of industries in 2000-01.

# Conclusion

India has a long standing, well established inorganic chemical industry that produces a range of chemicals to support the country's thriving manufacturing sector. All the key alkaline chemicals and basic inorganic chemicals are growing in the domestic and exports markets. Imports have also gone up, to cater to growing domestic demand.

In some important products, such as, carbon black and caustic soda, the growth in demand has outstripped capacity creation, leading to very high capacity utilisation levels. Thus there is a need for investment into the industry, to enable the industry to realise its growth potential.

Most of the chemicals clusters in India are located in the western region and these states offer a conducive ecosystem for the industry. Progressive states, such as, Andhra Pradesh and Tamil Nadu could be other options for investors to consider.

## PROFILE OF KEY PLAYERS

### Tata Chemicals Limited (TCL)

- TCL is India's leading manufacturer of inorganic chemicals. It also manufactures fertilisers and food additives.
- Incorporated in 1939, the company has an annual turnover of over US\$ 665 million and is part of the US\$ 14.5 billion Tata Group.
- TCL operates the largest and most integrated inorganic chemicals complex in India, at Mithapur in Gujarat. A pioneer and market leader in the branded, iodised salt segment, the company manufactures salt that has a purity percentage of 99.8 per cent, the highest in the country. It is also among the largest producers of synthetic soda ash in the world.

- TCL operates in two segments: Fertilisers and inorganic chemicals. The inorganic chemicals segment products include soda ash, salt, marine chemicals, caustic soda, cement and bulk chemicals.

### Nirma Limited

- Nirma, started off as a one man effort by Dr. Karsanbhai Patel in 1969. Over the years, it has grown to become a significant player in India's chemical sector
- It has invested US\$ 250 million in a soda ash plant with a capacity of 650,000 tonnes per annum. It has 40 MW captive co-generation plant that can handle 10, 000 MT of solid. The plant also uses energy efficient technology, from AKZO, Netherlands. It is the only soda ash plant in the world with full DCS control
- Some of the industrial products manufactured by Nirma limited are linear alkyl benzene, alfa olefin sulphonate, Sulfuric acid, Glycerin, soda ash, pure salt, vacuum evaporated iodised salt, single super phosphate and sodium silicate
- The turnover of soda ash production has increased in 2005-06 as compared to 2004-05, to US\$ 73.15 million from US\$ 60.35 million
- The company has plans of setting up caustic soda plant which has the capacity to produce 200 MT/day

### Travancore Alkali & Chemicals Limited

- The company is into manufacturing caustic soda and chlorine
- The company also intends to produce chlorinated latex, which will increase the demand of chlorine. Chlorinated rubber paint is extensively used in ports, because of the corrosive atmosphere. The company is presently looking out for technology tie-ups, to improve chlorine utilisation

- The company had a turnover of US\$ 32 million in FY'07, which is higher compared to US\$ 28.5 million in the previous fiscal.
- The company has plans of setting up a captive hydel project in the state of Kerala, as power is a major component of input costs.

### **DCW Limited**

- DCW is a diversified manufacturer of basic chemicals. The products manufactured by the company are caustic soda, liquid chlorine, soda ash and others. The company has successful record in developing downstream and related products
- DCW commissioned a plant for the production of caustic soda in 1959. The output of caustic soda has been increased in stages, from 28,000 TPA to 80,000 TPA, making DCW one of the leading producers of this basic chemical in India
- Modernisation has been an ongoing activity to improve productivity & efficiencies in the electrolysis of Caustic Soda, replacement of old equipment and installation of continuous salt saturators have resulted in substantial energy savings
- The by-product chlorine, is fully used to add value in-house. With increasing demand for liquid chlorine, the plant capacity has been increased from 60 TPD to 80 TPD
- The company had gross sales of US\$ 173.25 million and the earnings before tax was around US\$ 7.21 million

### **Kilburn Chemicals Limited**

- The company is a leading producer and exporter of anatase grade titanium dioxide, in India. It produces titanium dioxide by the Sulphate route. KCL also manufactures and exports the by-product, ferrous sulphate.
- KCL's manufacturing plant is based at the Sipcot Industrial Complex in Tuticorin, in Tamil Nadu. The plant commenced operations in November 1994.
- The plant is ISO 9001-2000 certified and the company's titanium dioxide pigment is certified by the Bureau of Indian Standards, as conforming to IS-411 specifications.
- The production of titanium dioxide by the company has increased over years, from 3,703 MT in 2000 to 11,043 MT in 2007, at a CAGR of 17 per cent.
- The overall turnover of the company stands presently at US\$ 16 million and has seen growth at a CAGR of

13 per cent. The company also registered a net profit after tax of US\$ 1.6 million

### **Tanfac Industries Limited**

- This company was incorporated in 1972, as a part of the Aditya Birla Group. The company manufactures inorganic chemicals, like aluminium fluoride, hydrofluoric acid, ammonium bifluoride, etc
- In 1999, the company diversified by manufacturing value added products called organic fluorine chemicals, such as, dichloro fluoro-benzene, acetophenone in 1999. The plant is located at Cuddalore, in Tamil Nadu
- The company's turnover is around US\$ 30.2 million

### **Triveni Chemicals**

- The company is over 15 years old and produces aluminium fluoride, which it also exports
- The company's manufacturing unit is in Gujarat. Proximity to raw materials has enabled the company to cut down on transportation costs
- The company can cater to a bulk requirement of 1,000 MT per month and has total production capacity of 500 MT per month

### **Phillips Carbon Black Limited**

- It is a part of the RPG Group. The company has pioneered the carbon black industry in India. It is now the leading producer of carbon black in the country, catering to the needs of elastomer, plastic, paints and ink manufacturing industries
- The company was incepted in 1960 and production started from December 1962, using oil furnace technology, the most widely accepted manufacturing process of carbon black patented by its then collaborator and Phillips Petroleum Company, USA. The collaboration ended in 1978
- In 1988 PCBL entered into a technical agreement with Columbian Chemicals Company, USA and acquired access to the modern state-of-the-art carbon black technology. This resulted in the company gaining flexibility, product range, production capacity and energy conservation.

- The company's present installed capacity is 270,000 MTPA. The company is not only the largest exporter of carbon black from India, but also one of the largest in Asia in its field

### **Hi Tech Carbon**

- HiTech Carbon (HTC) is a unit of Aditya Birla Nuvo Ltd. HTC, is one of the leading and most advanced manufacturers of furnace grade carbon black
- The company started in the year 1988 at Renukoot in Uttar Pradesh and had a capacity of 20,000 MT per annum for manufacturing carbon black. Since then, the company has achieved increased capacities of 1, 60,000 MT per annum
- In the year 1998, HTC developed another facility at Gummidipoondi in Tamil Nadu and later doubled the manufacturing capacity to reach 84,000 MT per annum in 2004
- Currently HTC exports roughly one third of carbon black capacity to the overseas customers in the international market.

### **Vaigai Chemical Industries Limited**

- The Vaigai Group, was established in 1981 in the city of Madurai, in Tamil Nadu. The company is in the fields of chemicals, edible oils, textiles, construction, etc.
- Chemicals have been the core area of operation for Vaigai, since its inception. The Chemical division is located at Karaikal, about 250 kilometers from Madurai
- The 6000 MT capacity complex is India's second largest potassium chlorate manufacturing plant. The company is a major supplier of potassium chlorate to the fireworks and safety match industries and has a 40 per cent market share in India



### **Exchange Rate Used**

<b>Year</b>	<b>Exchange Rate (INR/US\$)</b>
2000-01	45.75
2001-02	47.73
2002-03	48.42
2003-04	45.95
2004-05	44.87
2005-06	44.09
2006-07	45.11

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