



POTENTIAL OF PLASTICS INDUSTRY IN NORTHERN INDIA WITH SPECIAL FOCUS ON PLASTICULTURE AND FOOD PROCESSING -2014

A REPORT ON PLASTICS INDUSTRY



Knowledge & Strategy Partner



TATA STRATEGIC MANAGEMENT GROUP



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Sidharth Birla
President

**Federation of
Indian Chambers
of Commerce and Industry**

Federation House
Tansen Marg
New Delhi 110001
T +91 11 2335 7364
F + 91 11 2332 9369
E president@ficci.com
sbirla.ficci@birlas.com
www.ficci.com

MESSAGE

Plastic industry is making significant contribution to the economic development and growth of various key sectors in the country namely: Automotive, Agriculture, Construction, Electronics, Healthcare, Textiles, and FMCG etc. It is one of the fastest growing industries in India. It has expanded at ~8% CAGR over the last five years to reach ~8.5 MnTPA (million tonnes per annum) in FY13 from ~6 MnTPA in FY08 and future prospects are also good.

Due to their versatility, and imperviousness to water they save significant amounts of energy and water resources and emit lower quantum of green house gases. Plasticulture applications are one of the most useful indirect economy & agriculture inputs with huge unrealized potential such as: Water Management/ Nursery Management / Surface cover cultivation / Controlled environment agriculture/ Innovative Packaging Solutions and Organic Farming-HDPE vermin bed etc. These can help the country to meet both food and nutrition needs at a time when population growth is @ +1% p.a with depleting natural resources such as land & water. That also points to a valuable opportunity for sustained growth of the Indian plastics industry

I am pleased to know that Federation of Indian Chambers of Commerce & Industry, jointly with the Department of Chemicals & Petrochemicals, Government of India is organising a conference "Potential of plastics industry in North India with focus to plasticulture and food packaging. The aim of this conference is to debate the issues and potential of this important emerging sector and determine the way forward. I am confident that the Conference will achieve its objectives and wish the participants all success.

New Delhi
17 June 2014

(Sidharth Birla)

Industry's Voice for Policy Change

A report on
Plastics Industry



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Preface



Manish Panchal

Practice Head - Chemical & Energy
Tata Strategic Management Group
Manish.panchal@tsmg.com



Charu Kapoor

Principal - Chemicals
Tata Strategic Management Group
charu.kapoor@tsmg.com



P S Singh

Head- Chemicals & Petrochemicals
FICCI
prabhsharan.singh@ficci.com

Federation of Indian Chambers of Commerce & Industry (FICCI) & TATA Strategic Management Group (TSMG) have been regularly tracking the petrochemicals industry and supporting companies, both big and small, across various chains to achieve business excellence. The same knowledge and experience gives us an additional advantage to realize this report.

Accelerated globalization, rapid change in technology and growing consumerism have brought with it sweeping changes and abundant opportunities for petrochemical companies to grow locally and globally. Significant investments are coming up in India in this sector in the next few years. For example, Reliance is planning to invest USD 8 billion over next four years in petrochemical projects. Indian Oil is investing USD 1.3 billion in setting up petrochemical complex at Paradip refinery. Besides these, four PCPIR's are under various stages of development which will further improve the petrochemical landscape in India. In addition, low plastics consumption (per capita basis) in India compared to many developed nations, offers a platform for immense growth.

Historically, major percentage of the population in northern India has been engaged in agriculture. Though the land is very fertile and supplied with abundant water, the farmers are still affected with the problems of low productivity and low return on investment primarily due to heavy dependence on monsoons. Going forward, plasticulture applications has the potential to offer them the much needed solutions to improve productivity and reduce dependence on monsoons and therefore will drive demand for plastics.

As per industry estimates, 35-40% of the food products produced in India are wasted due to deficient infrastructure and lack of food processing capabilities. Plastics find applications in packaging which protects the longevity and quality of food. This sector in India also offers significant potential for growth leading to increase in demand for plastics.

We sincerely thank all industry leaders whose valuable inputs have helped in developing this report. As always it was an insightful experience for the team to materialize this report. We hope it acts as a guiding light both for the players and the consumers of plastics.

1

Executive Summary

Plastic industry is making significant contribution to the economic development and growth of various key sectors in the country such as: Automotive, Construction, Electronics, Healthcare, Textiles, and FMCG etc. Its demand has been growing rapidly at ~10% CAGR to reach 10 MnTPA by FY13. India is currently net importer of PolyEthylene (PE), however with the commissioning of IOCL plant at Panipat, the imports are expected to go down significantly.

India observes significant regional diversity in consumption of plastics with Western India accounting for 47%, Northern India for 23% and Southern India for 21%. Bulk of the consumption in Northern India is from end use industries of Auto, packaging (including bulk packaging), plasticulture applications, electronic appliances etc. which are concentrated mostly in UP and Delhi- NCR (>50%). However, plastic processing in other parts like Rajasthan, Punjab, Haryana, Uttarakhand, J&K and Himachal Pradesh are expected to grow based on increased availability of feedstock and higher focus on manufacturing sectors.

Northern India is said to have an inherent disadvantage of being away from ports hence a difficult target for low cost supply of plastics through import. However this same situation makes the domestic plastic processing more competitive and provides significant opportunity. Current low levels of per capita consumption (9.7 Kgs) along with increased growth in end use industries could propel the growth of plastics in North India further. Plastics application in agriculture can also lead to huge monetary benefits as well as improve the overall productivity. Besides Plasticulture can also be a good answer to the falling water table in North India. Additionally, full potential of plastics in food processing is yet to be tapped and that can help in meeting the food and nutrition security of the nation.

Indian Plastic industry faces environmental myths and lacks in technology. Going ahead recycling & reuse of plastics could be a foremost step towards fostering innovation and sustainability. Also increased awareness through help of industry groups and Government could help address some of these challenges.



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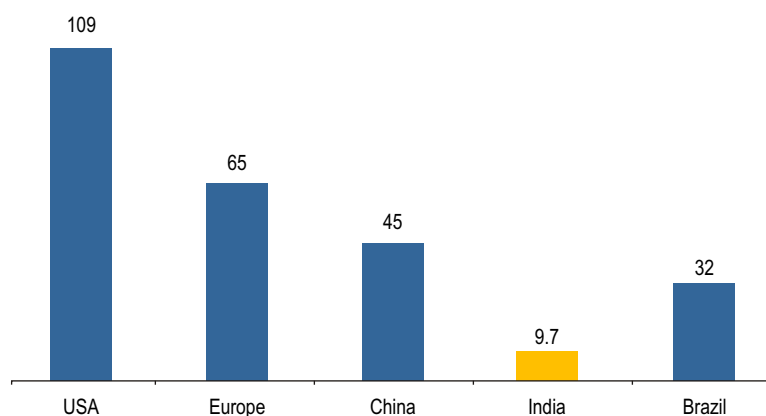
Introduction

The chemical industry is critical for the economic development of any country. Indian chemical sector accounts for ~13% of the gross value added by the industries segment. With Asia's increasing contribution to the global chemical industry, India emerges as one of the focus destinations for chemical companies worldwide. Chemical industry is critical for the economic development of any country as it offers products and solutions for virtually all sectors of economy.

The chemical industry in India currently stands at ~USD 115 Bn in FY13 and is expected to grow at ~8% p.a. over the next 5 years. Indian petrochemical industry which includes the end products like polymers, synthetic fibers, surfactants etc. constitute ~20% i.e. ~USD 23 Bn market.

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. These industries hence drive the demand growth of petrochemicals. Current low per capita consumption level of plastic products as compared to developed countries per capita consumption suggests that India offers a huge opportunity over long term (Refer Figure 1).

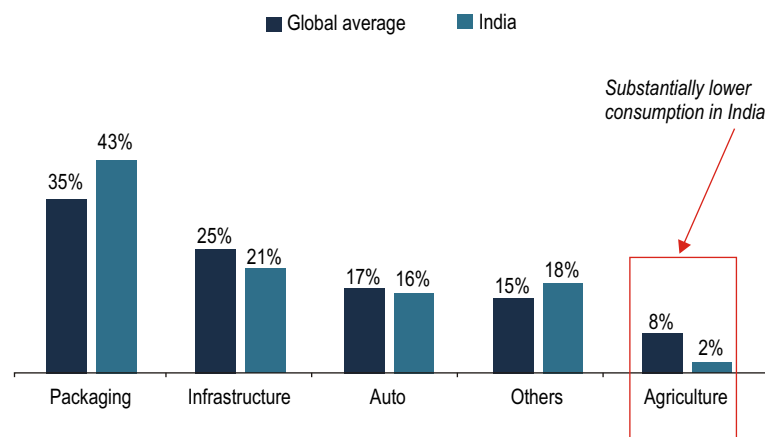
Figure 1: Per capita plastic products consumption (Kg/person)



Source: PlastIndia, Business Press, Research by Tata Strategic

Packaging industry in India has seen a strong penetration of plastics as compared to global standards. However, agriculture sector still hasn't explored the benefits of plastics to a large extent. Global average for plastics demand in agriculture is ~8% while India is substantially lower at only 2%.

Figure 2: Polymer utilization by application, Fy13



India offers strong opportunity for manufacturing of petrochemicals in future with its plan to increase the share of manufacturing in GDP from 16% to 25% by 2022. The increasing demographic dividend, urbanization, growing income levels all support a strong case of increase in both demand and supply of petrochemicals in India. Plastics are the major product that account for bulk of the Indian petrochemical industry.



3

Plastic industry in India

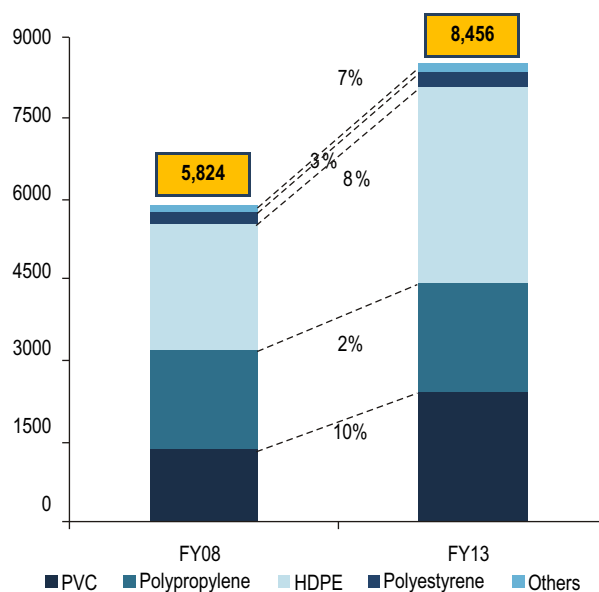
A wide variety of plastics raw materials are produced to meet the material needs of different sectors of the economy. These polymeric materials are broadly categorized as commodity, engineering and specialty plastics. Commodity plastics are the major products that account for bulk of the plastics and in turn for petrochemical industry. Commodity plastics comprise of Polyethylene (PE), Polypropylene (PP), Polyvinyl Chloride (PVC) and Polystyrene. While engineering and specialty plastics are plastics that exhibit superior mechanical and thermal properties in a wide range of conditions over and above more commonly used commodity plastics and are used for specific purpose. These include styrene derivatives (PS/EPS & SAN/ABS), polycarbonate, poly methyl methacrylate, polycarbonates, poly oxy methylene (POM) plastics etc.

There are three broad types of PE, viz: Low-density Polyethylene (LDPE), High-density Polyethylene (HDPE) and Linear Low-density Polyethylene (LLDPE). Major plastic materials like PE and PP are derived from Ethylene and Propylene respectively, while other plastics such as PVC, PS & ABS and PC are produced from benzene, butadiene and other feedstock.

1) Demand overview

Plastics industry is one of the fastest growing industries in India. It has expanded at ~8% CAGR over the last five years to reach ~8.5 MnTPA (million tonnes per annum) in FY13 from ~6 MnTPA in FY08. (Refer Figure 3).

Figure 3: Demand growth of plastics ('000 TPA), CAGR, FY08-13

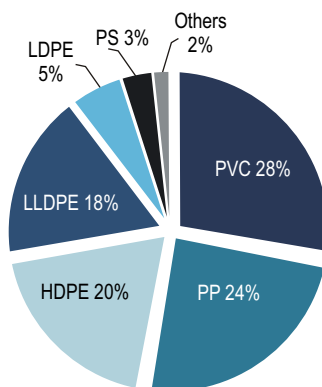


Source: Chemicals & Petrochemical Statistics, Analysis by Tata Strategic

Polyethylene (PE) is the most largely used plastic raw-material by Indian industry. Its demand has grown at 8% CAGR in last 5 years to reach ~3.6 MnTPA in FY13. Polypropylene (PP) is the second largest with consumption growing from 1.8 MnTPA in FY08 to 2.1 MnTPA in FY13 at a growth rate of 2% p.a.

Polyvinyl Chloride (PVC) demand has grown at 10% p.a. from 1.2 MnTPA to 2.1 MnTPA in FY13. Poly-Styrene (PS) has observed a slower growth rate of 3% p.a. to reach ~250,000 TPA in FY13, while other (PC/ ABS etc.) have grown at 7% p.a. from 94,000 TPA to 141,000 TPA in FY13 (Ref figure 4)

Figure 4: Demand breakup of plastics by types, FY13



Source: Chemicals & Petrochemical Statistics, Analysis by Tata Strategic

Polyethylene (PE), which includes HDPE, LLDPE and LDPE (High Density PE, Low Density PE and Linear Low density PE), accounts for the largest share i.e., 43% of total consumption, while PP accounts for 24% of total consumption. Within PE, HDPE is observing a moderate growth and has a consumption share of 20%. LLDPE is expected to grow at higher pace due to its increased penetration in LLDPE applications. Others include PS/EPS, ABS and engineering plastics.

To manufacture finished products, polymers are processed through various types of techniques namely extrusion, injection moulding, blow moulding and roto moulding. Various products manufactured through these processes are highlighted in the following table (Refer Table 1)

Table 1: Classification of plastic products by type of process

Plastic products	Extrusion	Films and Sheets, Fibre and Filaments Pipes, Conduits and profiles, Miscellaneous applications
	Injection moulding	Industrial Injection Moulding, Household Injection Moulding and Thermo-ware/ Moulded luggage
	Blow moulding	Bottles, containers, Toys and Housewares
	Roto moulding	Large circular tanks such as water tanks

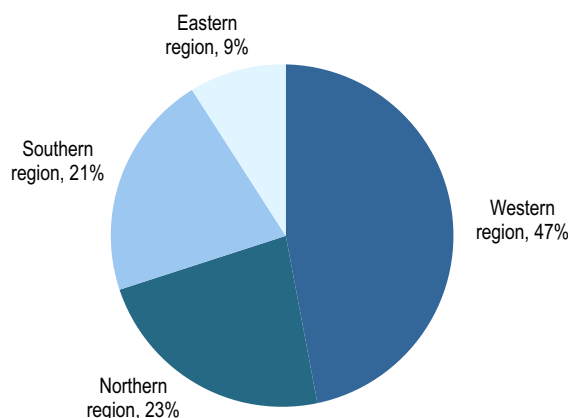
Source: CIPET

Extrusion process is the most commonly used process in India and accounts for ~60% of total consumption by downstream plastic processing industries. Injection moulding is the other popular process accounting for ~25% of the consumption. Blow moulding is used for ~5% while Rotomoulding 1% while the rest of the plastic is processed through other processes.

1.1 Scenario in Northern India

Western India has traditionally been the largest consumer of plastics accounting for almost 47% of the total consumption. The region wise distribution of consumption is given in Figure 5.

Figure 5: India - Region wise plastic consumption, 2013

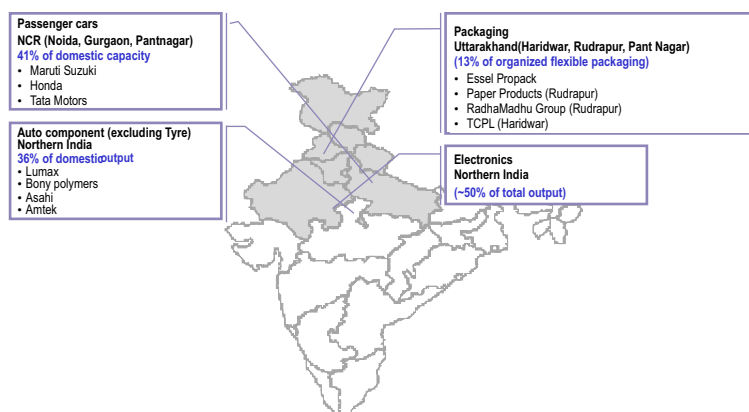


Source: IOCL, Industry reports, Research by Tata Strategic

Western region comprise of Maharashtra, Gujarat, the union territories of Daman and Diu & Dadra and Nagar Haveli along with Madhya Pradesh and Chhattisgarh. The total consumption of plastics in India in 2012-13 was ~10 MnTPA. Out of this Northern India accounted for ~23%. For the purpose of this report Northern India comprises of J&K, Himachal Pradesh, Punjab, Haryana, Uttarakhand, Rajasthan, UP, Delhi and NCR region.

Bulk of the consumption in Northern India is from end use industries of Auto, packaging (including bulk packaging), plasticulture applications, electronic appliances etc. Figure below reflects indicative list of some end use industries (Refer Figure 6) in Northern India.

Figure 6: Indicative list of some end use industries in Northern India



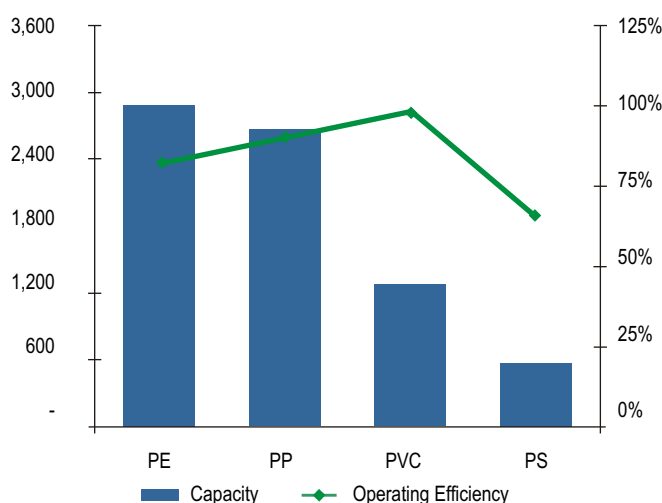
Source: Industry reports, Analysis by Tata Strategic

The consumption in Northern India is low in comparison to Western India (Refer Figure 6) primarily because of lack of availability of raw material. Reliance the largest petrochemical player in India had all its cracking units in West and this facilitated the growth of downstream plastic processing industry in Western region. However with IOCL Panipat cracker and HREL Bhatinda PP plant the availability of PE/ PP is not expected to be a constraint and hence facilitate downstream plastic processing units. The upcoming petrochemical complex at Barmer can also spurt the sector in the region.

2) Capacity overview

India has significant production capacity of Plastics. Polyethylene (PE) continues to be the largest commodity with LLDPE experiencing the fastest growth in this category. Current polymer capacities are mostly under-utilized with an operating efficiency varying from 66%-86%, except for PVC, where production matches with capacity (Refer Figure 7).

Figure 7: Production Capacity and Operating efficiency of plastics, Fy13



Source : Industry reports, Analysis by Tata Strategic

India has a ~2.9 MnTPA of PE production capacity out of which 1.6 MnTPA is HDPE capacity, 1 MnTPA is LLDPE and rest is LDPE capacity. PP and PVC also have the large production capacities, i.e., 3.7 MnTPA and 1.3 MnTPA respectively. PVC is one of the major products where capacity growth in past had been significantly lagging demand growth.

India has a ~400,000 TPA production capacity of PS and EPS. However, all these facilities are based on imported styrene since there is no local production of Styrene. In case of Engineering Plastics, there is a significant opportunity in India. Currently for

ABS India has a 100,000 TPA production capacity, while PC base resins are all imported. Polyamides have a limited production capacity, while other major engineering plastics are being mostly imported to cater the domestic demand.

Reliance Industries Ltd. (RIL) is the largest producer of commodity plastics in India. It has 1.16 Mn Tonnes per annum (TPA) capacity of PE, 2.7 MnTPA capacity of PP and 650,000 TPA capacity of PVC (Refer Table 2). RIL's production facilities are located in Gujarat and Maharashtra. RIL is the only producer of LDPE in India.

Haldia Petrochemicals Ltd. (HPL) is another key player with PE capacity of 710,000 TPA and PP capacity of 390,000 TPA. HPL's Plants are located in eastern region of India. Other major players are Indian Oil (IOCL) & Gas Authority of India (GAIL) with their plants located at Panipat and Auraiya respectively. These plants mainly cater to the northern regional demand of plastics. IOCL have 650,000 TPA production capacities of PE and 600,000 TPA of PP, while GAIL has 505,000 TPA capacity of PE.

India has significant production capacity of Plastics. Polyethylene (PE) continues to be the largest commodity with LLDPE experiencing the fastest growth in this category. Current polymer capacities are mostly under-utilized with an operating efficiency varying from 66%-86%, except for PVC, where production matches with capacity (Refer Figure 7).

Table 2: Production Capacity of plastics by major players, FY13

Producer	PE	PP	PVC	Others
RIL	1,165,000	2,700,000	650,000	-
IOCL	650,000	600,000	-	-
GAIL	505,000	-	-	-
HPL	710,000	390,000	-	-
Chemplast Sanmar	-	-	250,000	-
Finolex	-	-	270,000	-
Supreme	-	-		272,000
Ineos ABS	-	-	-	60,000

Source: Plastindia, Analysis by Tata Strategic

In downstream plastic processing, India has over 23,000 processing units. Total Machines installed for plastic processing were 98,000 in FY13. The total processing capacity has increased to 30.0 MnTPA in 2013 from 11.7 MnTPA in 2006.

2.1 Scenario in Northern India

In Northern India, IOCL and GAIL are the two plastic producers with plastic production capacity of 1.25 MnTPA and 0.5MnTPA. Indian Oil Corporation Limited (IOCL) is the largest oil company in India in terms of revenues. It is promoted by the Government of India with Government holding 79% shares. IOCL commissioned its Panipat cracker in February 2011. The Group owns and operates 10 of India's 20 refineries with a combined refining capacity of 65.7 MnTPA.

Govt. of India has 57% stake in GAIL. It is a dominant player in natural gas trading business and uses natural gas as the feedstock for production of ethylene and in turn produces Polyethylene. GAIL has plans to double its plastic production capacity by 2014. HREL's Bhatinda Polypropylene plant (0.44MnTPA) was commissioned in 2012. All put together the plastic production capacity is expected to go up to 2.5MnTPA by 2014-15. The figure below maps the plastic production facilities along with their capacities.

Availability of ~2.5 MnTPA of plastics in Northern region may result in spur of investments in downstream plastic processing. Moreover since the north region does not have access to ports, hence the import/ export potential is restricted because of additional cost of transportation. This could result in ensuring a self-sufficient demand-supply scenario for the north as the optimal solution.

Figure 8: Plastic production capacities in Northern India



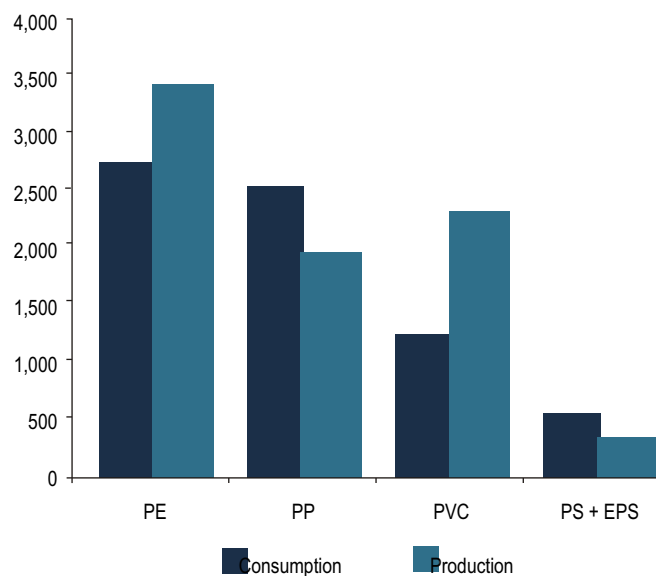
3) Import-export scenario

India is overall deficit in plastics and a lot of these materials are imported to cater the unmet domestic demand. The major import source countries are Saudi Arabia, Qatar, UAE, Korea, USA, Singapore, Thailand, Germany, Spain and Malaysia. As reflected in Figure 9, India is deficit in PE, PVC and engineering plastics. In FY13, ~2.3 Mn TPA of PE was produced while domestic consumption was ~3.4 Mn TPA. In case of PVC, the FY13 domestic demand stood at 2.1 Mn TPA and the domestic production was 1.2 Mn TPA. Polyamides consumption was 54,000 TPA, while domestic production was 13,000 TPA. Other major engineering plastics were imported.

Few Plastics materials are produced in surplus and these materials are exported to international markets. Major export destinations are China, Egypt, UAE, Turkey, Vietnam, and Indonesia. In FY 13, Indian production of PP stood at 2.5 Mn TPA while demand was 2.1 Mn TPA only. Similarly domestic demand for PS/EPS was 340,000 TPA, while production was 400,000 TPA.

Figure 9: Demand-supply scenario of plastics, FY13

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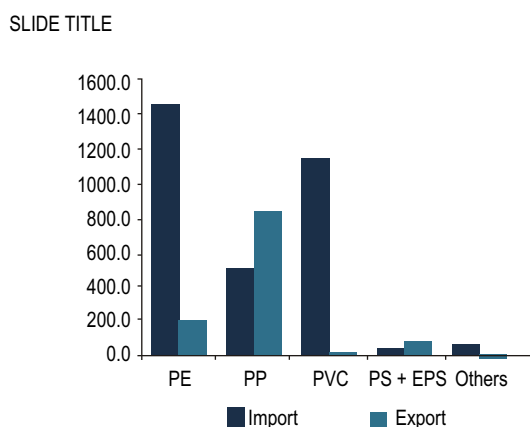


Source: Govt. of India Statistics, Analysis by Tata Strategic

India is deficit in PE is dependent on imports for fulfilling demand. In FY13, 1.2 MnT of PE was imported. PP production exceeds the domestic consumption and hence caters to international markets as well. India exported ~800,000 tonnes and imported ~450,000 tonnes of PP in FY13 (Refer Figure 10).

Domestic production of PVC is not enough to cater the demand and hence 30% of demand is met through imports. 1000,000 tonnes of PVC was imported in FY13. India is a net exporter of PS, while most of the engineering plastics are being imported.

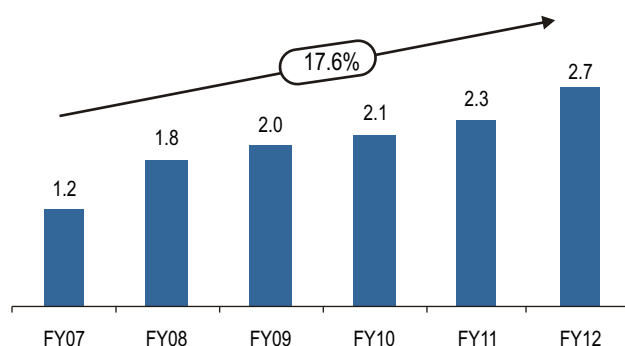
Figure 10: Import-export scenario of plastics (in KT), Fy13



Source: Intracen, Secondary research

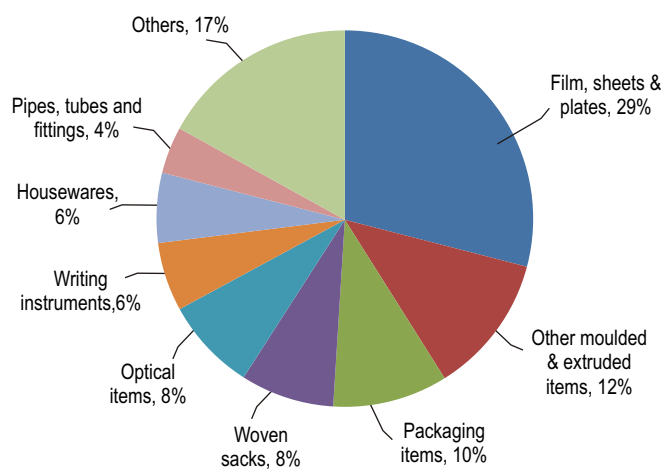
Exports of plastic finished goods have more than doubled in the last 5 years from ~\$1.2 Bn in 2007 to \$2.7 Bn in 2012. But fierce competition from countries such as China, Indonesia, Taiwan and other South Asian countries are restricting growth. The exports of these value added plastic products could be a huge growth opportunity if Indian manufacturers can increase/ maintain their manufacturing competitiveness while ensuring high quality. (Ref: Fig 11 & Fig 12)

Figure 11: Exports of value added plastic products (Bn USD)



Source: Planning Commission Report

Figure 12: Product wise breakup of plastic product exports in 2012-13



Source: Plastindia, Analysis by Tata Strategic



4

Plastics applications in Agriculture

1 970s witnessed the first Green Revolution in India. With the adoption of high - yielding variety of seeds along with better farming techniques like better use of fertilizers, insecticides and pesticides, made it possible for India to turn to a self-reliant agricultural nation. India currently supports nearly 16% of worlds' population with 2.4% land resources and 4% water resources. Nearly 65% of population directly or indirectly depends on agriculture and it provides employment to 58.2% of population. Also, it contributes nearly 17% of India's GDP consuming 80% of available water resources

1)Plasticulture Applications

Plasticulture refers to use of plastics in agriculture and horticulture. Plasticulture provides variety of applications in modern agriculture and promise to transform Indian agriculture and bring in the "Second Green Revolution". Both the quality and the quantity of the crops and other farm products can be optimized using various techniques. Some of the major applications of Plasticulture are:

Table 3: Major Plasticulture Applications

Application	Comments
Drip Irrigation System	<ul style="list-style-type: none"> Precise application of irrigation water and plant nutrients at low pressure and frequent intervals through drippers/emitters directly into the root zone of plant
Sprinkle Irrigation System	<ul style="list-style-type: none"> Application of water under high pressure with the help of a pump. Water is released through a small diameter nozzle placed in the pipes
Ponds and Reservoir Linings	<ul style="list-style-type: none"> Plastics film lining to prevent against seepage in canals, ponds and reservoirs Also avoids depletion of stored water used for drinking & irrigation purpose
Plastic Mulching	<ul style="list-style-type: none"> Mulching is covering the soil around the plant with plastics film, straw, grass, hay, dry leaves, stones etc. Prevents loss of moisture and acts as a barrier between the soil and atmosphere
Greenhouse	<ul style="list-style-type: none"> Greenhouse is a framed structure covered with glass or plastics film Acts as selective radiation filter, in which plants are grown under the controlled environment
Plastic Tunnel	<ul style="list-style-type: none"> Plastics tunnel facilitates the entrapment of carbon dioxide, thereby enhancing the photosynthetic activities of the plant that help to increase yield

Plastics which are most widely used in agriculture, water management and related applications are PE, (LLDPE, LDPE and HDPE), PP and PVC.(Refer : Table 4)

Table 4: Polymers used in Plasticulture applications

S.no	Applications	PVC	LDPE	LLDPE	HDPE	PP
1	Drip Irrigation	Main/sub main lines	-	Laterals/emitting pipes	Screen filter	Drippers/emitters
		Control valves	-	Micro tubes	Disc filter	fittings
2	Sprinkler irrigation	Main/sub main lines	Connecting line	-	Main/sub main lines	fittings
		Control valves	-	-	Nozzles	Nozzles
3	Greenhouse	Main/sub main lines	UV films	UV films	Main.sub main lines	Ropes
4	Low Tunnel	-	UV films	-	Hoops	Ropes
5	Mulching	-	-	UV films	-	Non Woven

2) Plasticulture Potential

India is a vast nation. Every region has got specific agricultural characteristics and problems. These area specific problems can be tackled with innovative and scientific use of Plasticulture techniques. This would not only maximize the output of farms but also optimizes the input factors. Table 4 shows the region specific constraints in agriculture. For example, in Western Himalayan region the productivity is low because of constraints like severe soil erosion, degradation due to heavy rainfall/floods and deforestation and inadequate market delivery infrastructure.

Table 5: Region specific agriculture issues

States/Parts of States	Region Specific Constraints
J&K, HP, Uttarakhand	Severe soil erosion, Land Degradation, Poor market delivery infrastructure
Bihar, Eastern UP, West Bengal	Flood/Water logging, improper drainage, salinity, contamination
Western UP, Punjab, Haryana	Groundwater depletion, micro-nutrient deficiency, decreasing productivity
Assam, NE States, Sikkim	Aluminum toxicity and soil acidity, soil erosion and floods, shifting agriculture
Orissa, Jharkhand, Chhattisgarh	Moisture stress, drought, soil acidity, iron toxicity, poor infrastructure.

The application of Plasticulture can substantially decrease the costs and therefore can lead to high productivity with a better quality of crops. Table 5 shows the potential benefits from Plasticulture applications in terms water saving, water use efficiency and fertilizer use efficiency. Each application can drastically save water by about 30 to 100%. In case of farm pond lined with Plastic film the total loss by seepage of water can be minimized to zero which is highly beneficial. Also efficient use of fertilizers can bring the costs down which again is beneficial for the famers.

Table 6: Potential benefits from Plasticulture applications

Plasticulture Application	Water Saving (%)	Water Use Efficiency (%)	Fertilizer Use Efficiency (%)
Drip Irrigation	40-70	30-70	20
Sprinkler Irrigation	30-50	35-60	30
Plastic Mulching	40-60	15-20	25
Greenhouse	60-85	20-25	35
Shade Nets	30-40	30-50	Not Available
Tunnel	40-50	20-30	Not Available
Farm Pond Lined with Plastic Film	100	40-60	Not Applicable

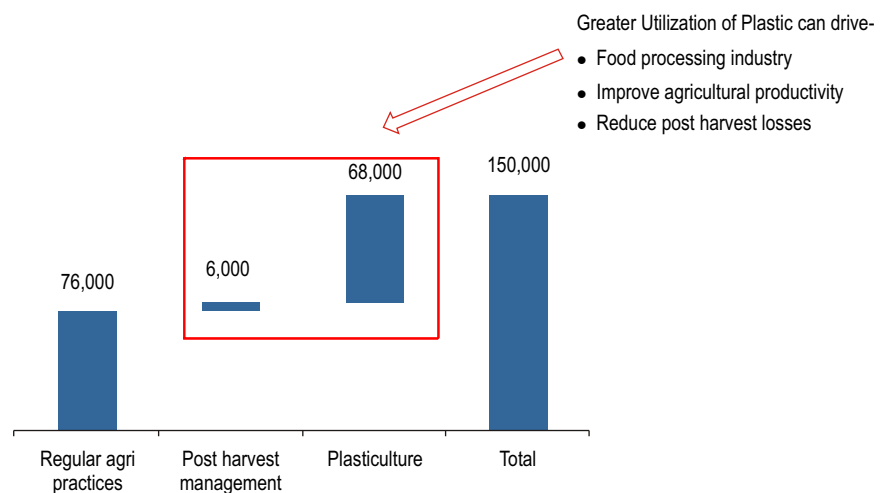
3) Opportunity with Plasticulture

To sum up, following are the opportunity that the agriculture sector has with enhanced usage of Plasticulture applications:

- Yield improvement upto 50-60%
- Water savings upto 60-70%
- Prevention of weeds growth
- Soil conservation
- Protection against adverse climatic conditions
- Fertilizer savings upto 30-40%
- Reduction in post-harvest losses
- Conversion - cold desert/wasteland for productive use

The greater use of plastic in agriculture can also help to a great extent to achieve up to fifty percent of the intended targets in Agriculture (as shown in the figure 13). The wider use of Plasticulture can reduce the loss of harvest and can increase the efficiency thus contributing more to the GDP. It is estimated that the agriculture output can be increased by ~INR 68,000 Cr by using proper Plasticulture applications like drip irrigation, mulching etc. Also, using innovative plastic packaging and handling techniques can promote proper harvest management which will in turn contribute towards the Agriculture-GDP.

Figure 13: Potential growth in Agriculture-GDP (in Rs. Cr.) through Plasticulture, FY13

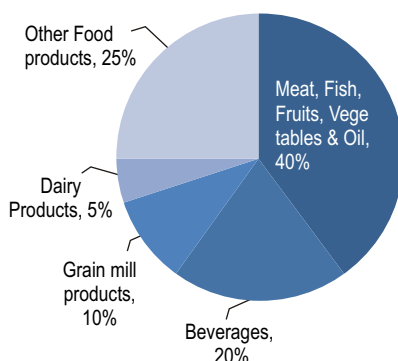


5

Plastics applications in Food Processing

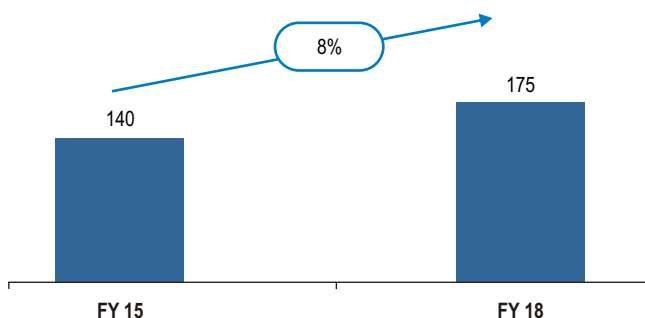
Food processing industry is highly fragmented. Around 42% of the industry is in the unorganized sector. Meat, fish vegetables, fruits and oil account for 40% of total food processing in India. Food processing account for ~9% of the total Indian manufacturing industry. Though it is a small sector, it is experiencing above average growth rates. (Ref: Fig 14)

Figure 14: Food processing segments (% share)



Currently, in India, processed food spends as a percentage of per capita GDP is very low compared to other developed nations. Therefore, the industry is likely to witness a strong growth in the future due to changing lifestyles of people. It has the potential to grow at ~8% p.a. over the next 5 years & is expected to be a \$100 billion industry by 2018. Currently, Gujarat, Maharashtra & Andhra Pradesh are the major food processing clusters in India. (Ref: Fig 15)

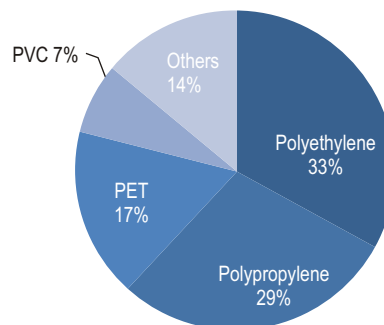
Figure 15: Growth projections for food processing sector (USD billion)



Plastic applications in Food processing:

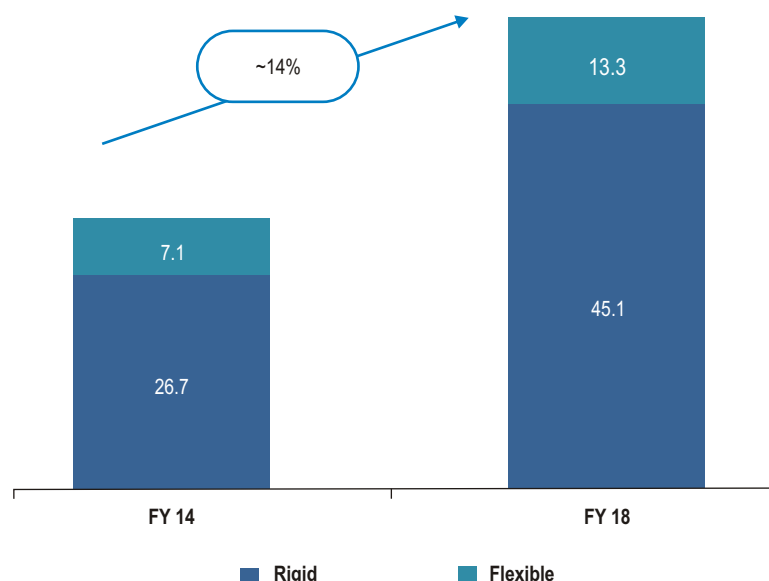
Major application of plastics in food processing is in packaging. Plastics are preferred for its characteristics and versatility of applications. It is light weight, corrosion resistance, moisture proof, highly versatile and can be moulded into attractive shapes. Additionally, packaging standards have become more stringent with introduction of new Indian norm closer to global standards which are also driving the use plastics in packaging.

Figure 16: Plastics in flexible packaging (% share)



Both flexible & rigid packaging is used in processed foods. Flexible packaging consists of either monolayer or multilayer films of plastics. Multilayered laminated sheets of plastics mainly include PE, PP, PET, and PVC. Polyethylene and polypropylene account for ~ 62% of polymer usage in the flexible packaging industry (Ref: Fig 16). Flexible packaging is dominated by small & medium sized companies with maximum usage in processed foods segment. The Indian packaging industry is expected grow at 15% p.a. with flexible packaging growing at 17% p.a. and rigid growing at 14% p.a. (Ref: Fig 17)

Figure 17: Indian packaging industry growth projection (USD billion)



Turnover of food processing industry in North India was Rs.60 billion (2010) and the major players being Britannia, Nestle & Pepsi. Uttarakhand (Haridwar, Rudrapur & Pant nagar) is one of the key packaging clusters in India. 13% of the total organized flexible packaging is from this region. The major players who are present here are: Essel Propack, Paper Products, Radha Madhu Group & TCPL.

With rising personal income, consumer preference for packaged products and changing food habits the food processing industry and the use of plastics in it is expected to grow at a high rate in this region as well.



6

Factors promoting opportunity in Northern India

OCL Panipat plant and HMEL Bhatinda plant has given an impetus to feedstock availability in Northern India which had minimal access to feedstock. GAIL also has plans to double its capacity which will further make the feedstock scenario more promising in Northern India. These will lead to increased investments in downstream plastic processing.

The macroeconomic trends for increase in demand of end use industry are more likely to impact regions of Northern India and Eastern India than rest of India. These two regions are in a growing phase and are facing significant change in lifestyle and in turn growth of domestic end use industries.

India's increased focus on manufacturing is likely to provide boost to downstream plastic processing industries in Northern India too. Increasing urbanization, changing lifestyle and demographic dividend are other factors promoting the opportunity of downstream plastics. Especially in Northern Indian states and near-by states of Bihar and Jharkhand, the lack of plastic processing industries presents a huge unmet opportunity potential.



7

Challenges for plastics industry in Northern India

1. Addressing environmental myths

While the usage and benefits of plastics are manifold, it invariably gets branded as a polluting material. The myth regarding the polluting characteristic of plastics needs to be addressed. Plastics are chemically inert substances and they do not cause either environmental or health hazards. If plastics can be collected and disposed of or recycled as per laid down guidelines/rules then the issue of plastic waste can be suitably addressed. In fact there is wide scope for industries based on re-cycling of plastics waste.

2. Technology needs

Technology needs are not particularly pertinent only to Northern India; they are the common need across India. The Indian Plastic processing industry has seen a shift from low output/low technology machines to high output, high technology machines. There has been some major technological advancement of global standards leading to achievements like;

- World's largest integrated Clean Room FIBC manufacturing facility
- World's largest water tank manufacturer in India. The Indian market is world largest market for rotomolded water tanks.

However, India's technology needs are critical in areas like high production and automatic blow molding machines, multilayer blow molding, Stretch/ Blow Moulding Machines, specific projects involving high CAPEX like PVC calendaring, multilayer film plants for barrier films, multilayer Cast lines, BOPP and Nonwoven depend solely on imported technology/machinery. Other technological needs are:

- Multilayer blown film line up to 9/11 layers
- Automatic Block bottom bags production line
- Higher tonnage Injection Moulding machine >2000 T
- Higher tonnage >500 T all electric Injection Moulding machines

3. Price pressure

The profits of plastics processing industry is facing tough times because of increased & volatile input prices. Increase in crude oil prices along with the continuous fall in rupee value has led to lower profits in spite of higher volume realizations.

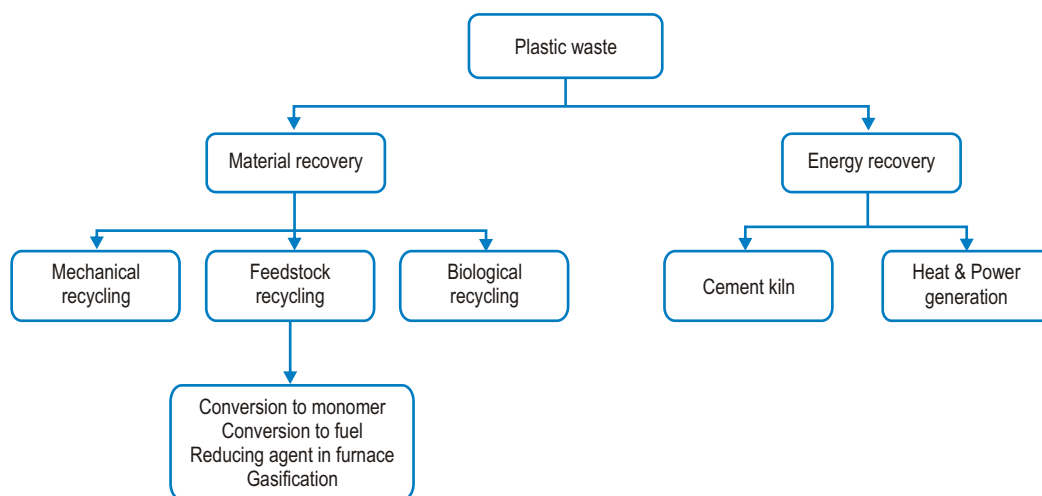


8

Recycling & Waste Management of plastics

Recycling of plastics is one of the foremost steps towards innovation and sustainability in this industry. Currently in India, number of organized recycling units for plastics is ~3,500 along with additional ~4,000 unorganized recycling units. Most of the plastics (PE, PP, PVC, PET, PS,) etc. could be recycled via mechanical route. Whereas, engineering plastics like PBT, SAN and Nylon etc. are recycled by selected recyclers. In India, recycling of plastics is currently 3.6MnTPA and it provides employment to almost 1.6 Million people (0.6 million directly, 1 million indirectly). The following figure shows the typical plastic recycling method. (Refer Figure 18)

Figure 18: Plastic recycling flow diagram



The collection & segregation of recyclable waste is one of the key steps in taking this further. Many a times, households and establishments throw the waste on the street or dump it in open without segregating the waste which reduces the quality and at times could make it hazardous. It is essential to save the recyclable waste material from going to the waste processing and disposal sites and using up landfill space. Salvaging it at source for recycling could make profitable use of such material. This will save national resource and also save the cost and efforts to dispose of such waste. An optimum way

to achieve it is by forming a habit of keeping recyclable waste material separate from food waste and other bio-degradable wastes, in a separate bag or bin at the source of waste generation, by having a two-bin system for storage of waste at homes, shops and establishments where the domestic food waste (cooked and uncooked) goes into the Municipal Solid Waste collection system and recyclable waste can be handed over to the waste collectors (rag-pickers) at the doorstep for transporting the same to the recyclers.

The Life Cycle Analysis of various plastics products reveals that plastics create lesser environmental pollution in the atmosphere compared to the alternatives. Energy consumption, emissions of Green House Gases like CO₂ and CH₄, quantum of water usage - in all parameters plastics create lesser foot print on earth.

Currently, less percentage of plastics produced is used for recycling whereas the potential is much higher. As plastic consumption is expected to grow at more than 10% CAGR for the next 5 years, the scope of recycling of plastics is huge.

Some form of plastics like plastics in packaging applications, plastics for some one-time use - like cups, plates etc. create waste management problems when the discarded plastics materials are not disposed of properly. Very thin plastic bags, though recyclable, are often left behind by the waste pickers due to economic reason. To avoid this problem, MoEF, Government of India had come up with rules in September 1999, restricting the thickness and size of plastic carry bags. These Rules have undergone modifications in June 2003 and later in 4th February, 2011 amended 2nd July, 2011. In the recent rules manufacturers and brand owners who use such bags have been made responsible for the waste management activity along with the Municipality / Local Bodies. Some state governments have also completely banned the use of plastic carry bags which are below certain microns

However the real solution lies in segregation of waste at source and promoting creation of waste management infrastructure coupled with investment in developing recycling centers. Best practices of other developed nations could be adopted for packaging waste, which follow a covenant of better product design to ensure reduction, re-use and recycling of packaging materials. There is also a need for public awareness and discipline towards recycling of plastic waste. Responsibility for increasing awareness lies on both government as well as industry. Maximum participation of all stakeholders is very important to tackle the issue of Plastics Waste Management. The support of successful NGOs can be adopted as role model and emulate similar system at different parts of the country through PPP mode by involving NGO, Municipal Corporation, the respective State/Central Govt.

Going ahead it is expected that the awareness of consumers and support from government is likely to increase the recycling of plastics and increase the magnitude of plastic waste management.

9

Conclusion

Commodity plastics comprising of Polyethylene (PE), Polypropylene (PP), Polyvinyl Chloride (PVC) and Polystyrene account for bulk of the plastic consumption in India. India has ramped up its production capacity for plastic to reach 2.9 MnTPA for PE, 3.7 MnTPA for PP and 1.3MnTPA for PVC. IOCL Panipat refinery has been a game changer for North India and along with commissioned HMEL Bhatinda plant and upcoming GAIL capacity expansion at Auriya it will increase the supply of plastics in Northern India. With increased supply of plastics, the focus should now be on the downstream plastic processing industries and how do they grow profitably.

There are several factors like low per-capita consumption, manufacturing focus, end use industry growth, availability of feedstock, increasing urbanization, changing lifestyle, demographic dividend etc. promoting growth of plastic across India. However specific to Northern India we observe a lack of planned downstream plastic processing plants within the region and near-by regions of Eastern India to make use of these factors. Spill off benefit of promoting plastic processing is the huge inherent employment potential.

Many application areas of plastics also have overlaps that make market driven material substitution a good possibility. There are strategic objectives driven by part consolidation and sustainability compulsions by the user industry that have made material selection converge to a polymer to promote recycling. An organized development addressing cost effective plastic processing along with streamlining operations of recycling of plastics could pave a growth path for downstream plastic manufacturers in Northern India.

Plasticulture, which is in its infancy in India, can significantly benefit agriculture by its wide applications in all the areas of farming. It can be used to tackle the specific problems faced by North Indian regions. There exists an opportunity in the same field as the demand of Plasticulture will rise in order to ensure efficiency and sustainability of agriculture practices.

Food processing sector in India is also at a nascent stage. The use of plastics in food processing is currently one of the lowest in the world. Application of plastics in food processing industry is poised to grow at a good rate. With the change in lifestyle, income levels and aspiration, the growth in the food processing sectors is expected to be very high. As plastics are majorly used for packaging such products, their demand is also expected to grow. North India is already a hub for food processing companies with major international players running their operations thereby promoting the consumption of plastics.



10

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Tata Strategic Contacts

Manish Panchal

Practice Head - Chemicals, Logistics and Energy

Mobile: +91 98205 20303

E-mail: manish.panchal@tsmg.com

Phone: +91 22 6637 6713



Charu Kapoor

Principal – Chemicals

Mobile: +91 98218 06071

E-mail: charu.kapoor@tsmg.com

Phone: +91 22 6637 6756



This report has been authored by: Manish Panchal (manish.panchal@tsmg.com), Charu Kapoor (charu.kapoor@tsmg.com) and Pulkit Agarwal (pulkit.agarwal@tsmg.com)

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Our Mission

To carry forward our initiatives in support of rapid, inclusive and sustainable growth that encompasses health, education, livelihood, governance and skill development.

To enhance the efficiency and global competitiveness of the Indian industry and to expand business opportunities both in domestic and foreign markets through a range of specialized services and global linkages.

For further details, please contact

Mr P. S. Singh

Head

Chemicals & Petrochemicals Division
FICCI

Federation House, 1 Tansen Marg,
New Delhi-110001

Tel: +91-11-23487473 (Dir)

Email: Prabhsharan.singh@ficci.com

Ms Charu Smita

Assistant Director

Chemicals & Petrochemicals Division
FICCI

Federation House, 1 Tansen Marg,
New Delhi-110001

Tel: +91-1123357350 (Dir)

Email: charu.smita@ficci.com

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For details contact

Mr P. S. Singh

Head-Chemicals & Petrochemicals Division
FICCI

Federation House, 1 Tansen Marg,
New Delhi-110001

Tel: +91-11-23316540 (Dir)

EPBX: +91-11-23738760-70 (Extn 395)

Fax: +91-11-23320714/23721504

Email: Prabhsharan.singh@ficci.com

Ms Charu Smita

Assistant Director-Chemicals & Petrochemicals Division
FICCI

Federation House, 1 Tansen Marg,
New Delhi-110001

Tel: +91-1123357350 (Dir)

EPBX: +91-1123738760-70 (Extn 474)

Fax: +91-1123320714/23721504

Email: charu.smita@ficci.com