



Plastic Additives

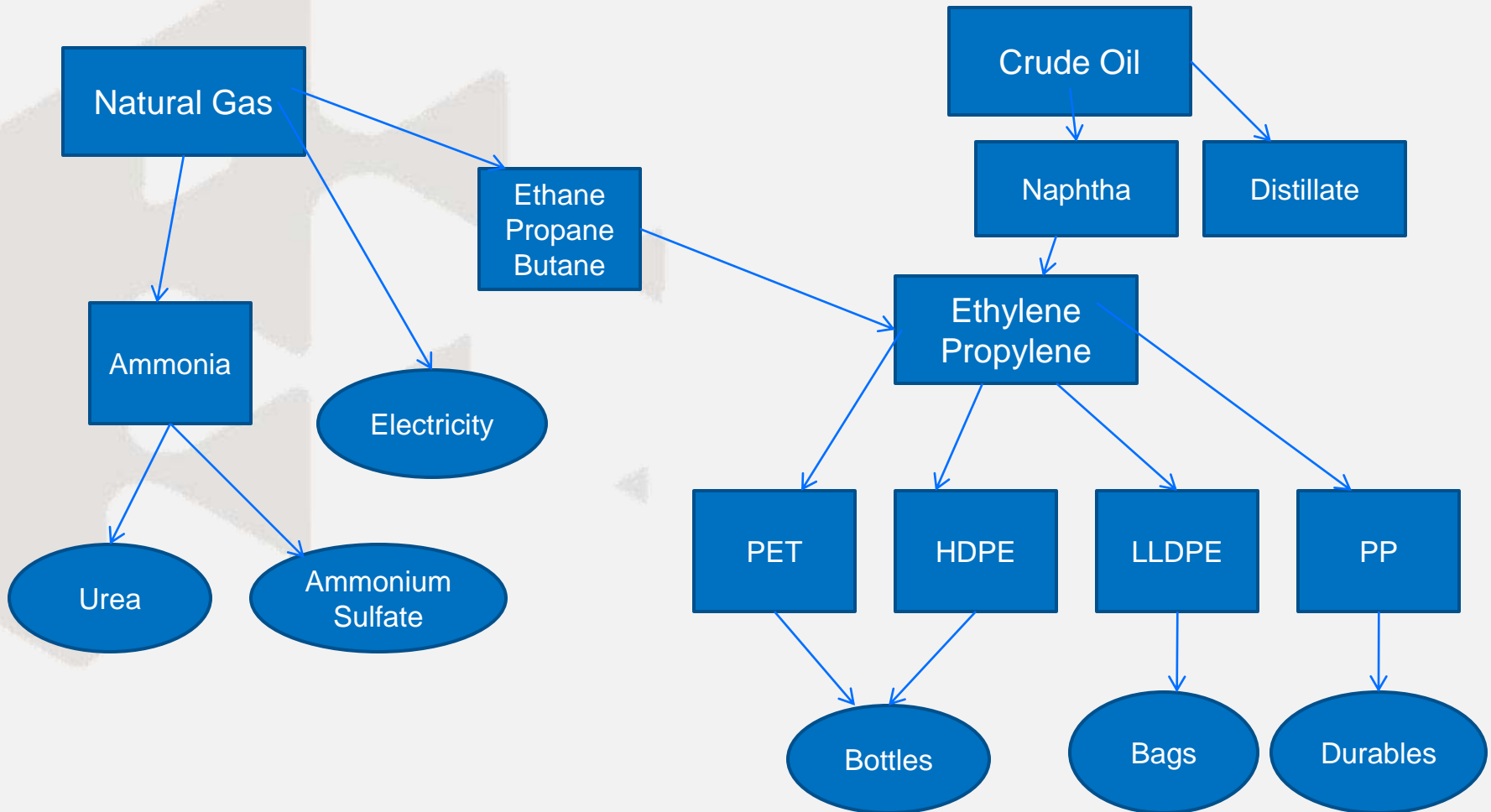
Value Addition & Growth to Polymers



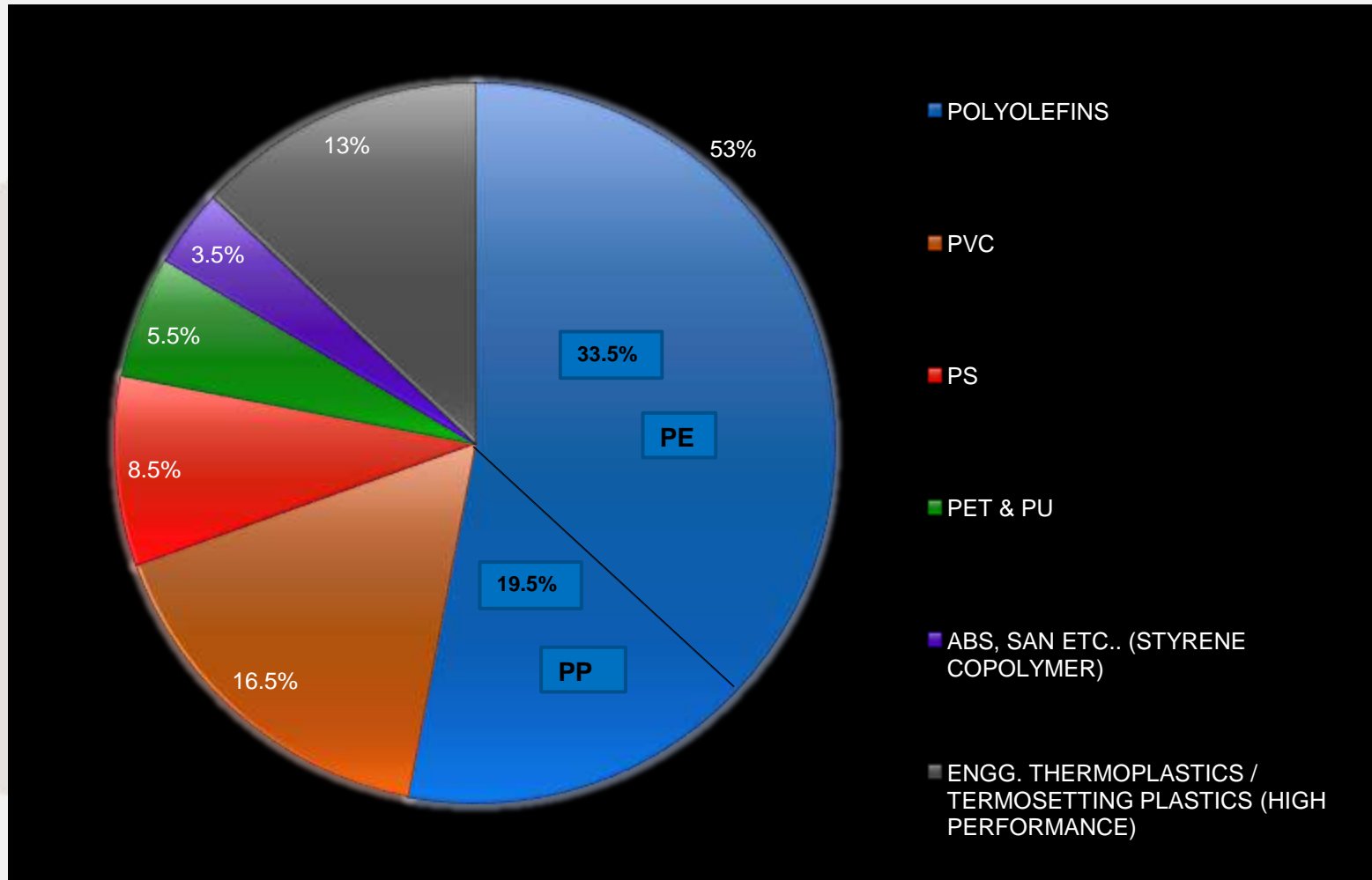
Polymer Industry

An Overview

Petrochemical Chain



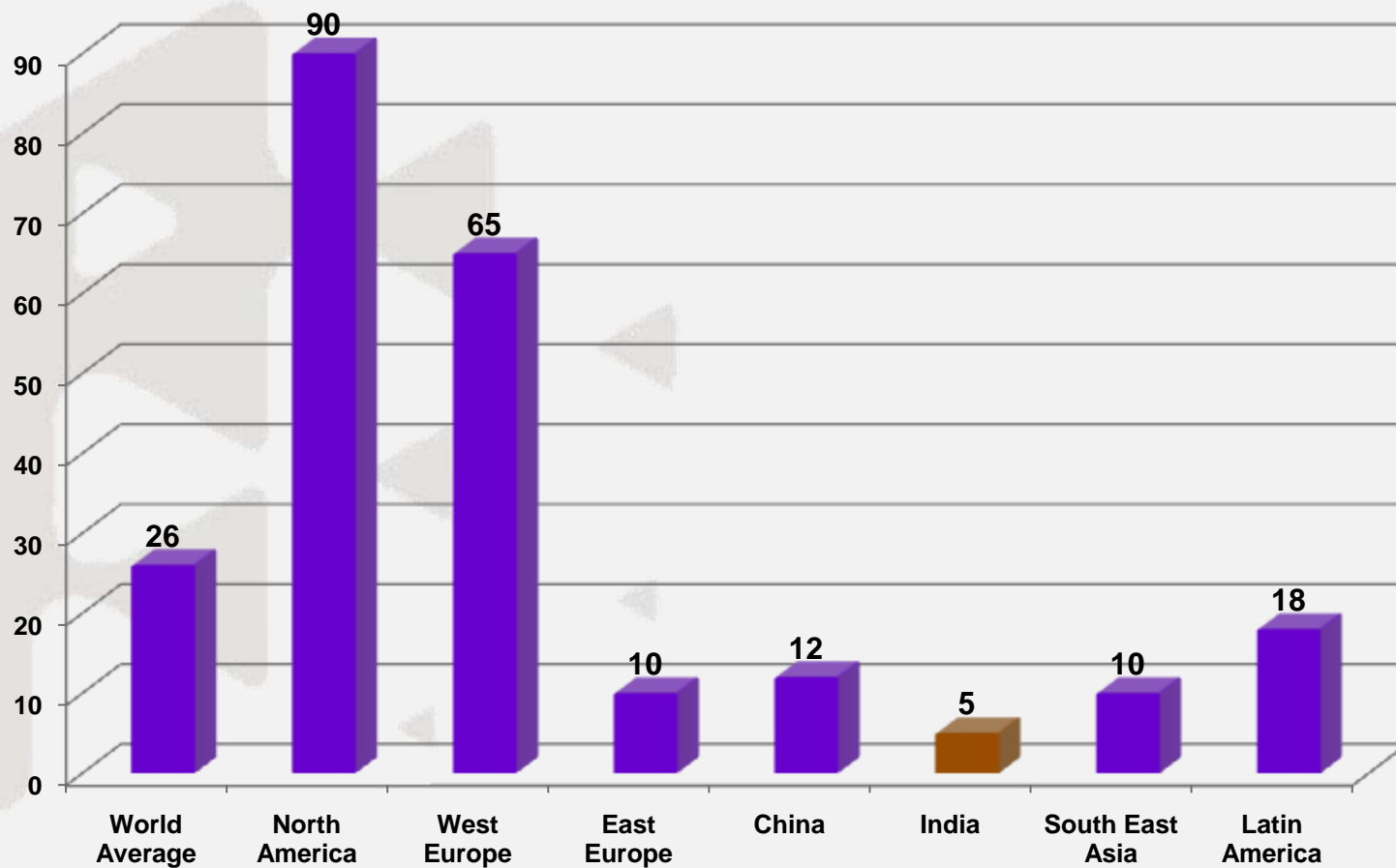
Global Plastics Consumption



Total 227 Million MT, Growth Rate is ~ 5%

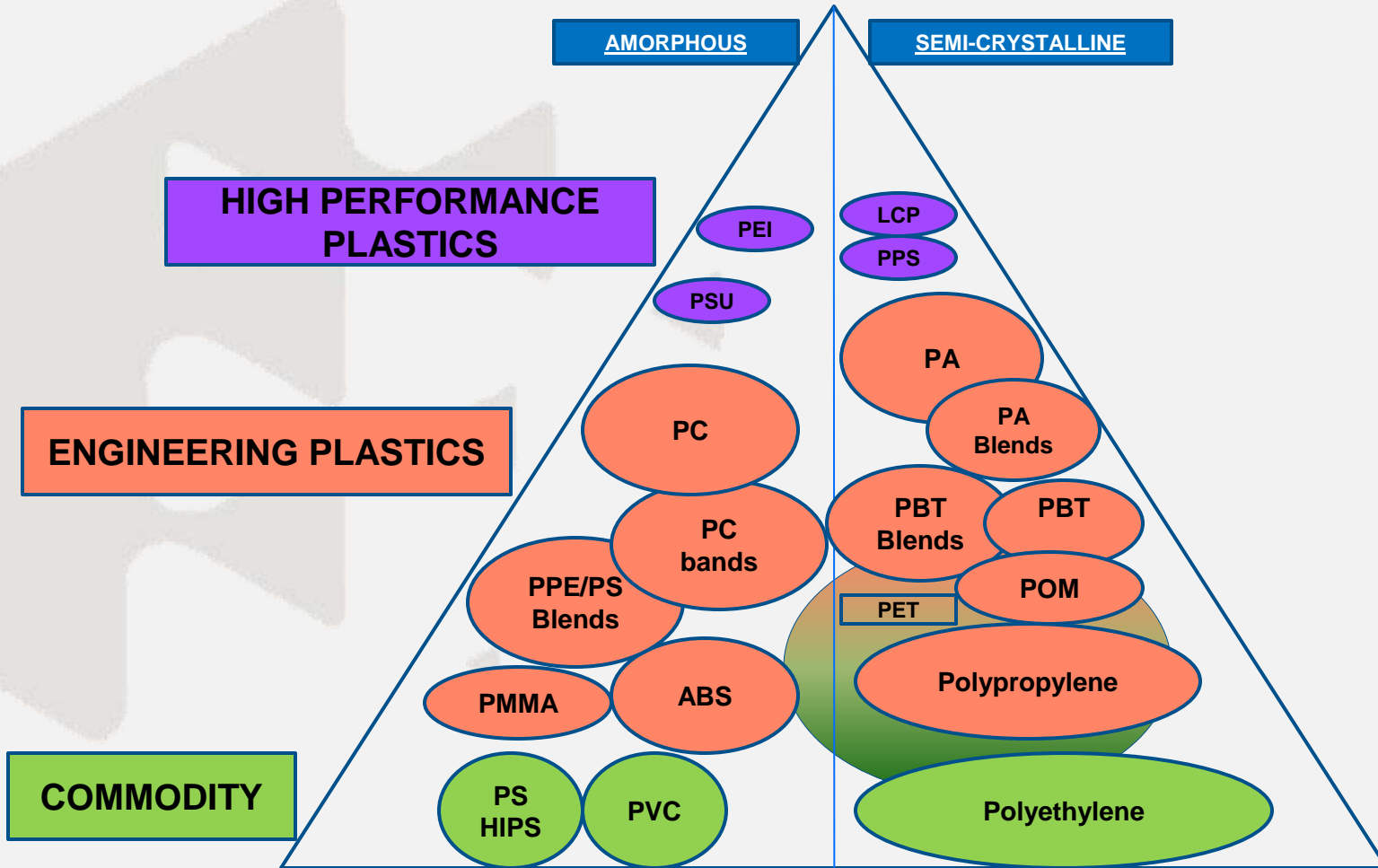
Source :CPMA - Statistics

Global per Capita Consumption of Plastics (in Kgs.)



Source :CPMA- Statistics

Engineering & Commodity Plastics



Source: PGPC2011

Current Indian Petrochemicals Players

Major Players	Polymer Products
Reliance Industries Limited	PP, HDPE, LDPE, HD/LL, Polyester, PVC
GAIL India Limited	HDPE, HD/LL
Haldia Petrochemicals Limited	PP, HDPE, HD/LL
Finolex	PVC
L.G. Polymer	PS/Styrene Copolymers

Source :APIC- Statistics

Current Indian Petrochemicals Players

Major Players	Polymer Products
Supreme Petrochemicals	PS
BASF Styrenics	PS
Chemplast	PVC
DCW	PVC
DCM Shriram	PTA, PVC
IOCL	PP, HDPE, HD/LL

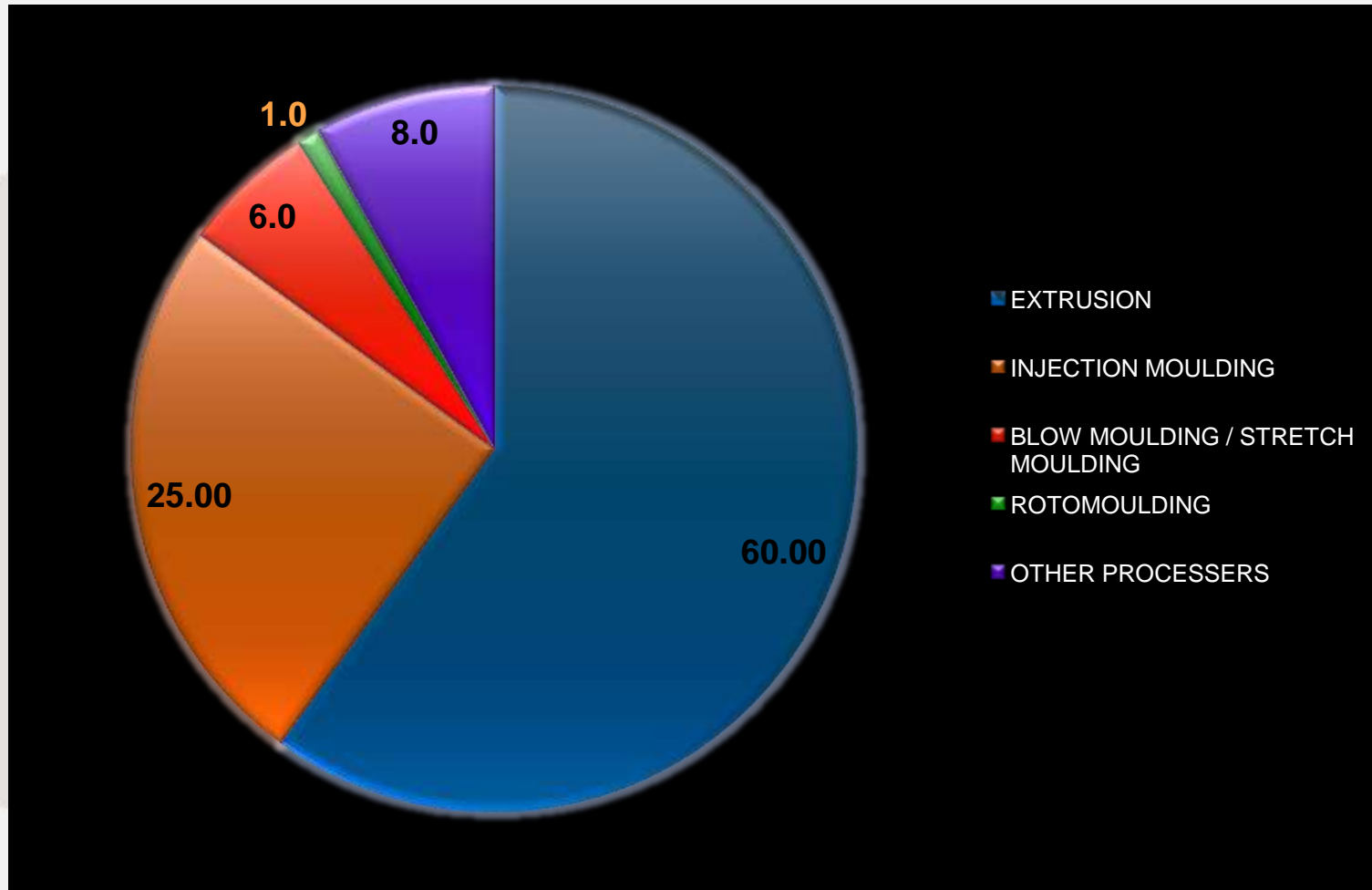
Source :APIC - Statistics

Current Indian Petrochemicals Capacities (in KT)

Polymers	PP	HDPE	LDPE	HD/LL	PTA	PS/Styrene Copolymers	PVC
Capacity	3368	1580	197	1200	3739	420	1321
Grand Total	11825 KT						

Source :CPMA/APIC - Statistics

The polymer consumption in India (%) according to various processes are provided as follows:



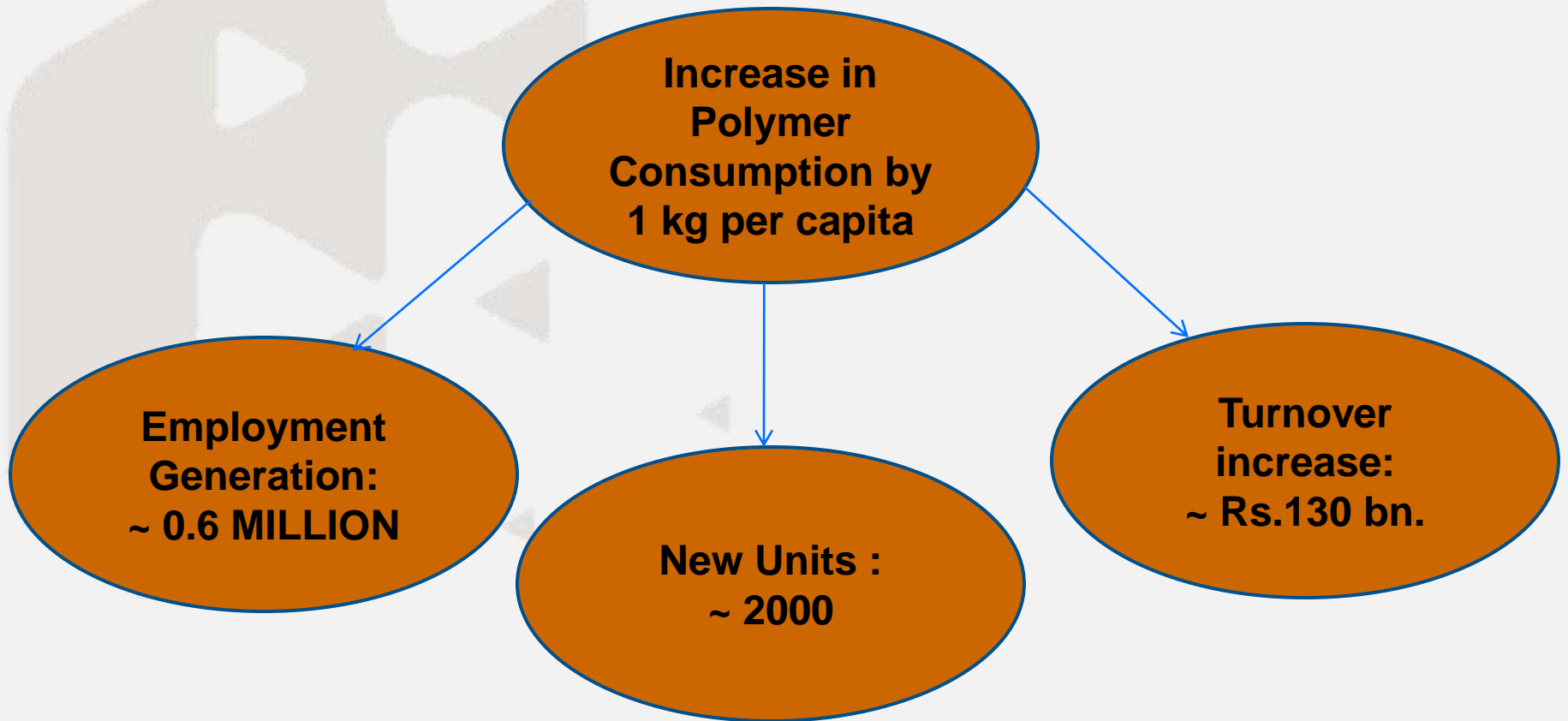
Source :CPMA/APIC - Statistics

Overview – Polymer processing industry

- ◆ **No. of processing units** ~ 29000
- ◆ **Annual Turnover** ~ 1 Trillion Rs.
- ◆ **Polymer consumption** ~ 7 m MTA
- ◆ **Average Size** ~ 250 MTA
- ◆ **Employment direct / indirect** ~ 3.5 million

Source :CPMA Estimates

Emerging Sectors : Opportunity : India



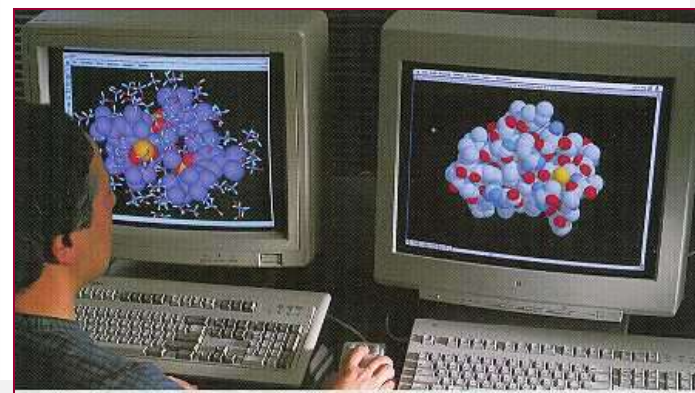
Additives

..... Lifeline for the Plastics Industry !

Additives – A Curtain Raiser !

“Innovation is the key for suppliers who seek to stay competitive in a tough global market.”

From improved versions of workhorse grades to better service strategies and formulations, designed for new emerging polymers and interpolymer competition, been the rule of the additives business.



Additives - An Introduction

Additive

“A chemical added to a host plastic to improve the overall performance of the system”

Additives are categorized by, the functions that they perform rather than their chemistry

Additive functions,

- Modifiers
- Property extenders
- Processing aids



Additive Classes

Modifiers

- ◆ Plasticizers
- ◆ Chemical blowing agents
- ◆ Coupling agents
- ◆ Impact modifiers
- ◆ Organic peroxides
- ◆ Nucleating agents
- ◆ Fillers



Additive Classes

Property Extenders

- ◆ Flame retardants
- ◆ Heat stabilizers
- ◆ Antioxidants
- ◆ Light stabilizers
- ◆ Antistatic agents

Processing aids

- ◆ Lubricants
- ◆ Mould release agents
- ◆ Antiblock / slip agents



Additive Supplier's Strategies

◆ Approach I

- ◆ Concentrate on specific industries, meeting specific regulatory requirements

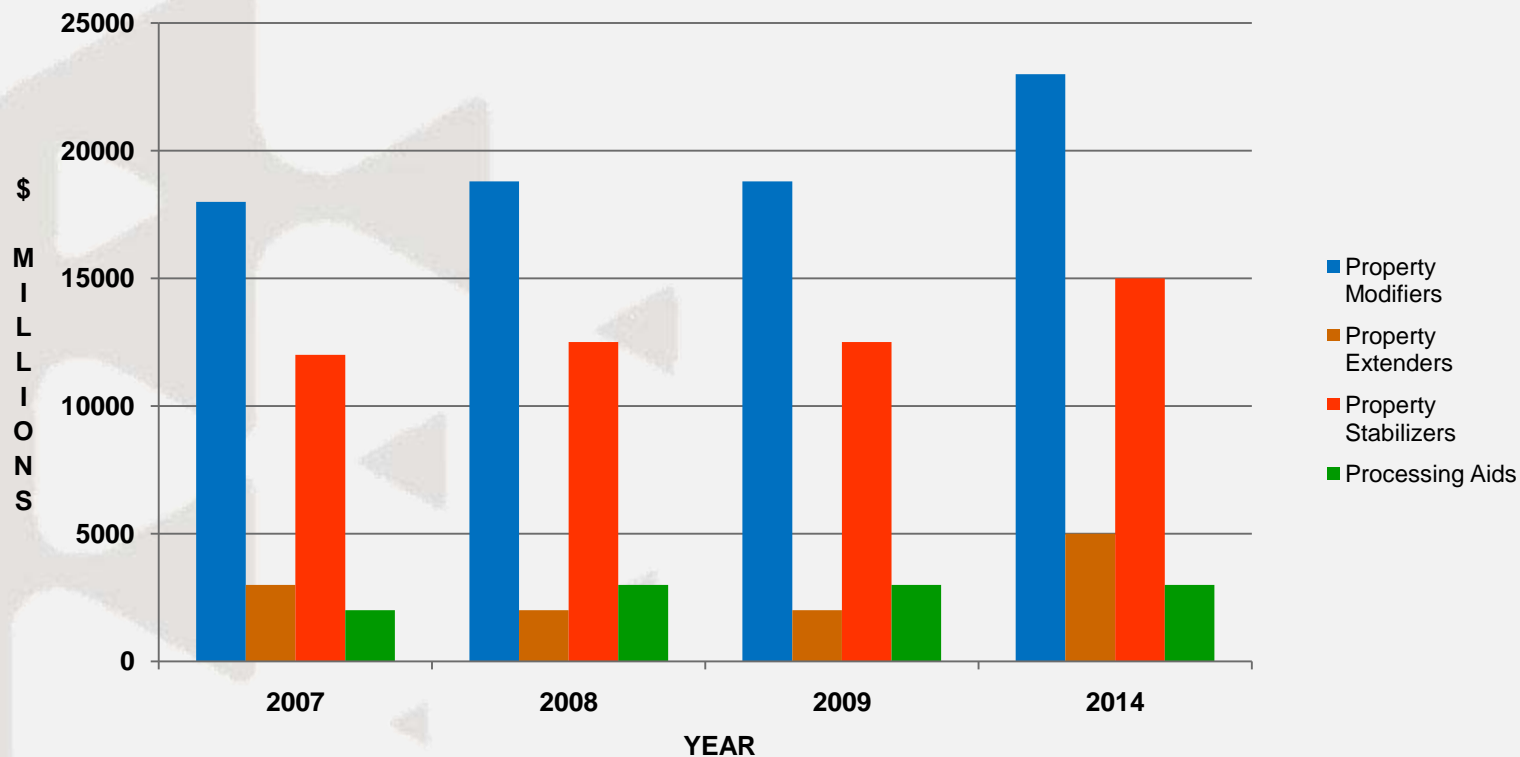
◆ Approach II

- ◆ Concentrate on specific materials and chemistries

- **Additive business in recent years has emerged as a major global segment of “value-added” speciality chemistry !**

Summary & Projected figures

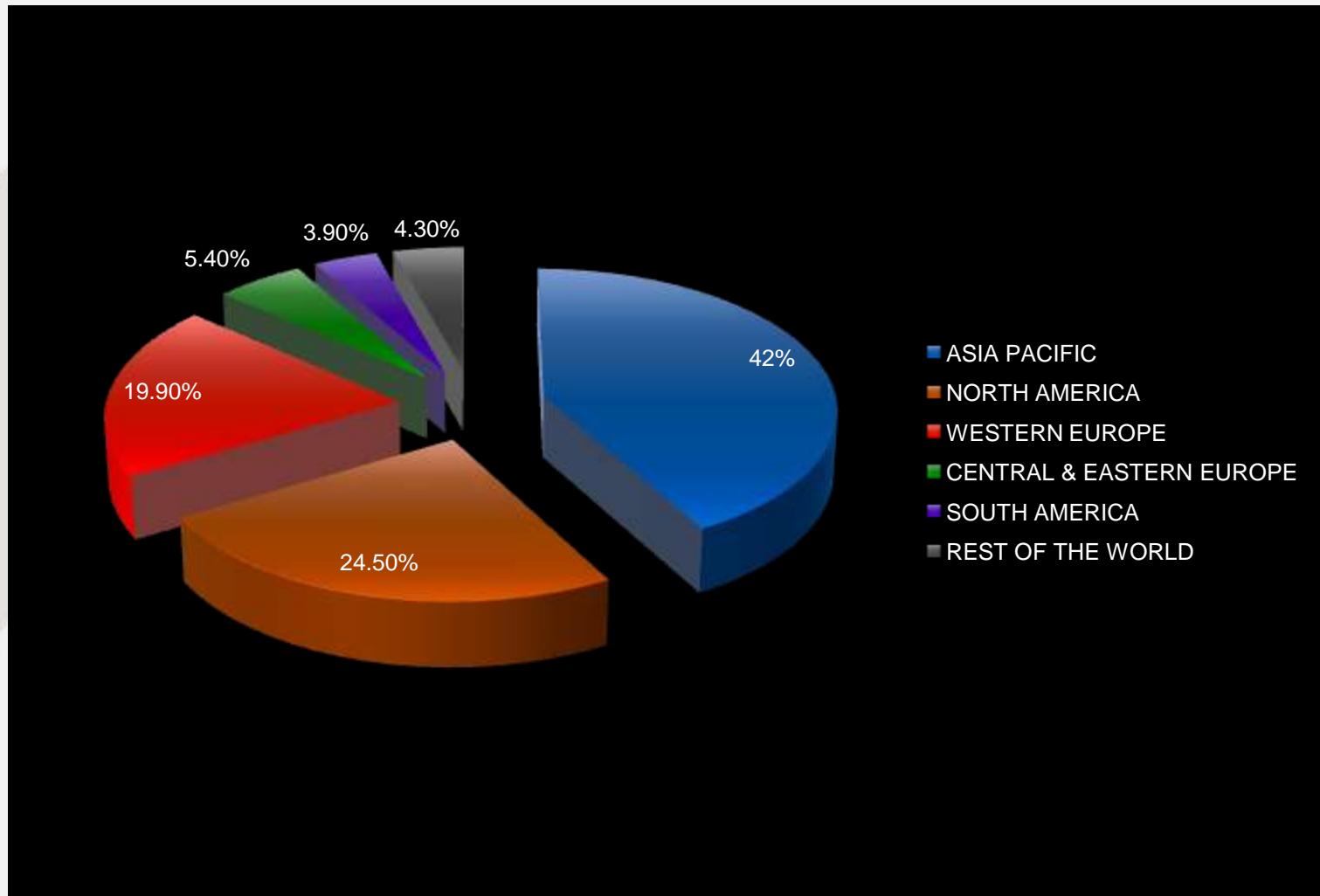
Global Market for plastics additives, 2007-2014 (\$ Millions)



Total Market for Plastics Additives expected \$ 45.8 Billions till 2014. Annual growth rate is ~4%.

Source : bcc Research, Market Forecasting

Global Share of Additives and Barrier Coatings Market



Source : PRW.com

Additives : Ingredients For Growth Of Plastics

Food Packaging – Role of Additives

Additives

- ◆ Antioxidants
- ◆ Pigments
- ◆ Processing aids
- ◆ Lubricants
- ◆ Clarifiers

Requirements

- ◆ Organoleptic properties
- ◆ Migration



New Trends In Plastic Additives For Packaging Applications

Plastics additives industry is always looking for new effects and performance like :

- Barrier properties at low cost
- UV protection of goods to improve shelf-life
- Improved shelf-life of foods
- Permanent antistatic performance
- Transparent products for aesthetic / price ratio
- Smart and intelligent packaging



Solutions From New Generation Additives For Packaging Applications

- ◆ UV additives
- ◆ Permanent antistatic agents
- ◆ High barrier properties with nanofillers

- ◆ Fresh Keeping Additives
 - ◆ O₂ absorbers
 - ◆ Moisture regulators
 - ◆ Antimicrobials
 - ◆ Odor scavengers



Additives Drive Automotive Plastics In New Directions : *Growth Drivers*

- ◆ Increased demands on polymer performance
- ◆ Plastics with increased thermal stability
- ◆ Plastics with longer weatherability
- ◆ Pressure to reduce costs of plastic parts
- ◆ Ability to lower molding cycle times

Additives:

- ◆ Antioxidants
- ◆ Light and heat modifiers
- ◆ Viscosity modifiers
- ◆ Impact modifiers
- ◆ Glass fibres
- ◆ Nanofillers



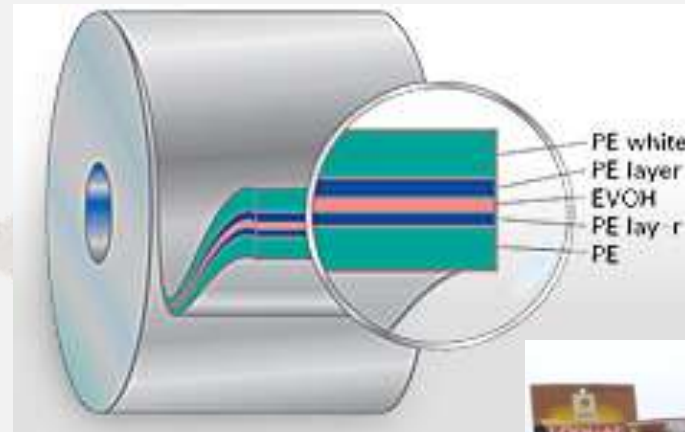
Growth Areas For Additives In Auto Applications

- ◆ **Light stabilizers**
- ◆ **Coupling agents for glass filled formulations**
- ◆ **Nucleating agents**
 - **Faster crystallization**
 - **Shorten molding cycle and productivity**
- ◆ **Additives for long glass fibre reinforced thermoplastics (30% pa) & masterbatches for LFTs (80% filled)**
- ◆ **Additives for nanocomposites based on PE & PP**
- ◆ **Additives for TPV masterbatches for replacement of thermoset rubber**

Nanocomposites : Driven by Rules of additivation

Nanocomposites

- ◆ Barrier packaging films
- ◆ In automobiles

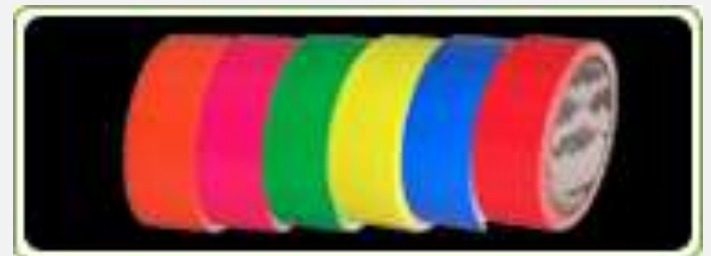


Modern Dispersing Agents

- ❖ **Pigment Dispersions**
- ❖ **Filler Dispersions**
- ❖ **Nanoparticles dispersions**

Applications:

- ◆ **Tape/Fiber applications**
- ◆ **Automotives**
- ◆ **Higher mechanical properties**



Largest Commodity Plastics – PP/PE

- ◆ **PP / PE sold commercially has certain additives & process property enhancers**
- ◆ **Compounding or melt mixing is the process of incorporating additives & modifiers into PP / PE for achieving uniformity on a scale appropriate to the quality of the product subsequently made from the polymer**

Additives For Polyolefin

- ◆ **Acid neutralizers**
- ◆ **Antioxidants**
- ◆ **Slip additives & processing aids**
- ◆ **Antiblocks**
- ◆ **Antistatic Agents**
- ◆ **UV stabilizers**
- ◆ **Nucleating agents & clarifiers**

Value - Added PP

- ❑ Filled & Reinforced PP compounds
 - ◆ Talc – Improves Stiffness
 - ◆ Calcium Carbonate – Improves surface finish
 - ◆ Glass Fibers – Increases mechanical properties

- ❑ Elastomer Modified PP compounds

Noteworthy Applications-

- Automotive Bumpers
- Instrument panels
- TPE & TPV as replacement for thermoset rubbers



PE Compounds

- ◆ PE (black) compounded for pipes, pipe coating, ducting
- ◆ Glass filled HDPE for telecom
- ◆ Calcium carbonate filled HM HDPE for paper-like films
- ◆ Specialty films for packaging electronic parts
- ◆ Foamable & foamed PE compounds
- ◆ Cross linkable & cross linked PE
- ◆ PE / PS alloys for engineering applications



Value - Added Polyolefins

Machinery for making compounds

- ◆ Single screw extruders
- ◆ Twin screw compounders
- ◆ Farrell Continuous Mixers
- ◆ Banbury Mixers
- ◆ Dispersion kneaders
- ◆ Buss – co - kneaders

Vision For The Next Ten Years !

- ◆ **Strong additive-based plastics applications**
- ◆ **Key areas for focus**
 - ◆ **Agriculture**
 - ◆ **Automotive**
 - ◆ **Appliances**
 - ◆ **Packaging**



Fine Organics



Company Profile

Overview

- ◆ **Manufacturer of Specialty Chemicals used in a wide range of applications**
- ◆ **Consistent growth since 1970**
- ◆ **5 Manufacturing facilities near Mumbai**
- ◆ **R&D Center in Navi Mumbai**
- ◆ **2 JV plants in Malaysia and Thailand**
- ◆ **Has immense global presence**



Plant Facilities

- ◆ Located close to the port
- ◆ Lean facilities with contingency planning
- ◆ Consistent quality through complete automation
- ◆ World-standard QC Labs and Warehousing
- ◆ High standards in safety, productivity and controls
- ◆ ISO 9001:2008, ISO22000:2005, Kosher, Halal and Jhospa certifications
- ◆ REACH registrations in progress
- ◆ Highly motivated team with a focus on quality



R&D Center

- ◆ Independent R&D center spread over 5,000 sq. m.
- ◆ Recognized by Dept. of Science and Industrial Research of the Ministry of Science and Technology of Govt. of India
- ◆ Sophisticated analytical laboratories
- ◆ Pilot plant with modern reaction and distillation facilities
- ◆ Application development support for plastics and foods
- ◆ Dedicated team of qualified scientists
- ◆ Research and solutions provider for several product and technology development centers worldwide



Fine Organics - Additives Presence

- ◆ **In Foods**
- ◆ **In Cosmetics/Pharmaceuticals**
- ◆ **In Textiles**
- ◆ **In Polymers**
- ◆ **In Coatings**
- ◆ **In Metal working, Paper, etc.**

Closing Thoughts

- ◆ **Focus on the versatility of Specialty Chemicals**
- ◆ **Technologically strong and commercially competent team**
- ◆ **World-standard infrastructure with in-house process design and application development**
- ◆ **State –of – the art fully automatized plants**
- ◆ **Excellent R&D facilities**
- ◆ **Several planned expansions until 2013**

Thank You....

