



Reliance
Industries Limited

Metal Replacement Opportunities with PP

V.Kannan
General Manager
Reliance Industries Limited

Mumbai
19th September 2008

Contents

Reliance – An Overview

PP – An Introduction

Opportunities

Role of Reliance

Reliance – An Overview

An Overview of Reliance

- Revenue : US\$ 34.7 bn (FY 08)
- Net Profit : US\$ 4.8 bn (FY 08)

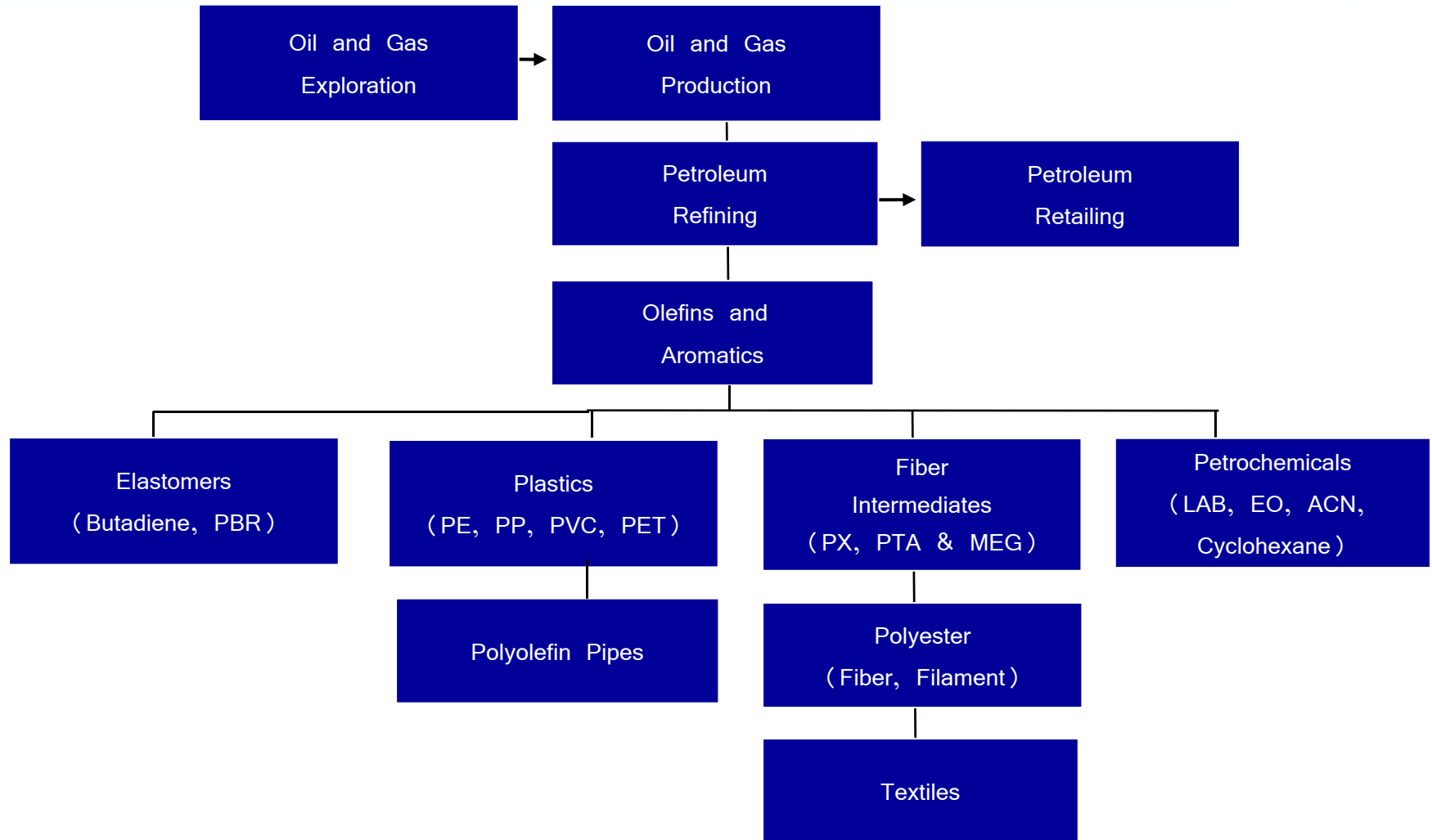
India and Reliance

- Revenue equivalent to 3 % of GDP
- 13.4 % of India's total exports
- 4.9 % of indirect taxes
- 6.6 % of total market capitalization
- Weightage of 16.5 % in BSE Sensex



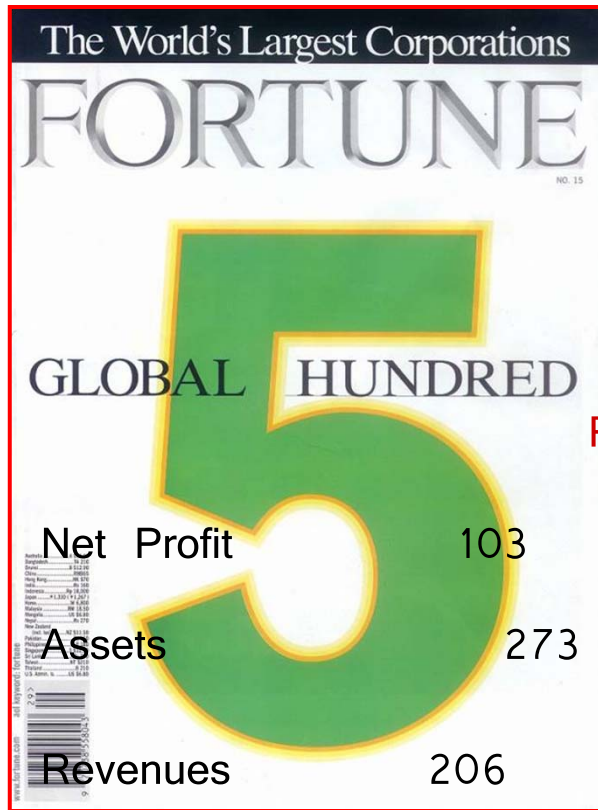
From India's no.1 company to one of the world's leading energy giants

Oil to Textiles: Value from Integration



The integration strategy has been at the core of our evolution & growth

Global Ranks



2008

Leading Global Capacities



Polyester
(Fibre & Yarn)



PX



Refining *



PTA



MEG



PP

Amongst top 10 global players
in all its core businesses

*3rd largest refinery at a single location

2008

Amongst the 30 'fastest climber' companies

Reliance Polymers

Product Overview

Our Branded Products...

PP



PE



PVC



Relpipe



Wide range of SKU's, within products, tailored to customer needs

Polymer Manufacturing Sites

Site	Polymer	Capacity	Technology
Baroda	LD	95	Total Petrochemicals
	PP	160	LyondellBasell
	PVC	55	Oxy Vinyl
Gandhar	PE	160	LyondellBasell
	PVC	245	Oxy Vinyl
Hazira	PE	450	Nova Chemicals
	PP	400	Dow Chemicals
	PVC	325	Oxy Vinyl
Jamnagar	PP	1050	Dow Chemicals
Nagothane	LD	110	Polymeri Europa
	PE	240	Ineos
	PP	120	LyondellBasell

All figures in KT

Efficient & effective absorption of diverse technologies

Reliance Sites: *Strategically Located*

- Domestic market share of over 50%
- 10 regional offices across the country
- Overseas offices: China, Vietnam, Indonesia, Turkey, Dubai, UK.
- Exporting to more than 50 countries



Offices across the country

PP - An Introduction

PP - 50 years of glorious journey

- Year 1957 – The Journey of PP began
- From few gm → 49 MMT in 50 years
- Fastest growing plastic in the world



Ziegler & Natta -Catalyst Inventors
1963 Noble Laureates

PlasticsTechnology™ ranked

PP no 2 among top 50 Innovations

1950s PP Bread bag/F&F



1960s Molded Parts



1980s Non-woven

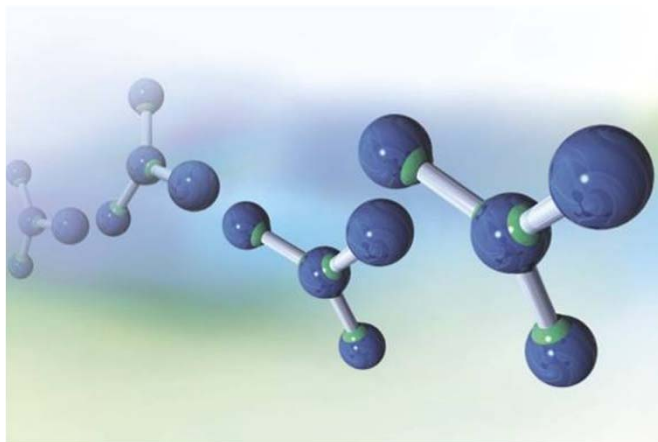


2008 Nano



It touches everyone's life ...24X7

Polypropylene : Versatile Plastic



- Lightest Plastic – Density 0.90 g/cc
- Excellent Mechanical Properties
- Excellent chemical and fungal resistance
- Low cost
- Easy Availability
- Compounded to suit engineering applications

Designed for diverse applications....

Polypropylene : Diverse Applications

Automotive

Car, Scooter, Truck, Autos

Appliances

Washing machine, Refrigerator, TV, AC, Fan,
Water heater, Vacuum cleaner

Packaging

Cement, Fertilizer, Food grains, Fruits & Vegetables,...

Medical

Syringes, IV bottles, Nonwoven disposables..

Textiles

Geo-Synthetics – Geo textiles , Gabions,
Construction fiber, geo grids, PVD

PP the most preferred plastic for many applications

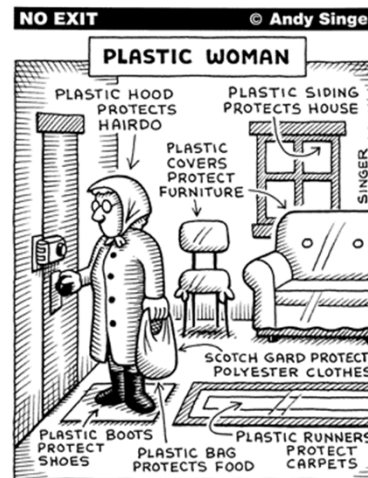
Evolution of material

Stone age – 3 million year ago



Metal age- 12th century BC

Chest & neck armour



Plastics age - 20th century

Plastics invented much later than traditional material usage

Plastics age signifies replacement of conventional material

Glass



Cotton



Blends of



& Nylon etc.,

Paper /jute

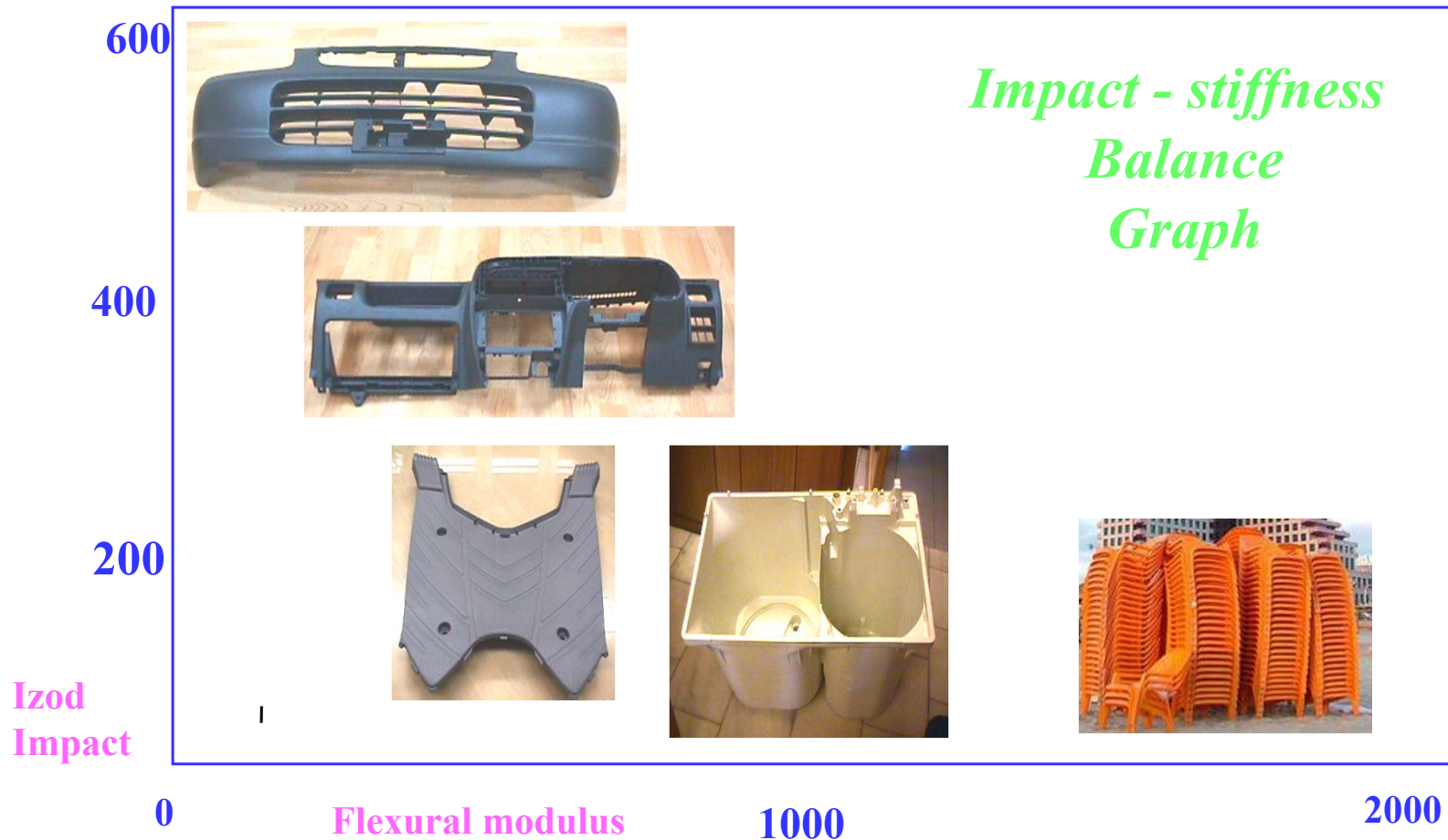


Metal



Metal replacement with plastics a common phenomena

Metal replacement – Non Engineering to Load bearing applications



PP the preferred choice for metal replacement

Why PP in metal replacement ?

Parts consolidation

Energy savings

Aesthetics

Corrosion free products

Cost economics

BENNETT COLEMAN & CO LTD

www.economictimes.com

Diktat To Reduce Prices To Pre-April Levels Would Result In Up To Rs 6,000-A-Tonne Cut

Subhash Narayan
NEW DELHI

"The entire exercise of providing relief to the steel sector would become meaningless unless price parity is restored between private and public sector compa-



MELTING POT

If prices are not slashed, the industry would face ban on exports, imposition of hefty export duties and bringing back steel under the ambit of Essential Commodities Act

Private and public sector steel companies including SAIL, Tata Steel, Ispat Industries, JSW Steel and Essar Steel have

announced they would hold steel prices at current levels in support of the government initiative to control inflation. Private companies are holding the price line after effecting a hike of Rs 5,000 per tonne as raw material surcharge while public sector giant SAIL has been holding on to the pre-April prices. In fact, the difference in steel prices between SAIL and private sector steel companies has widened to Rs 4,000-5,000 per tonne (for flat steel products).

In a bid to tame inflation, the government has been targeting the steel sector where prices have shot up 25% in three months. Rising steel prices is a major concern for the government as the alloy carries 7% weightage on inflation. A package is being finalised for approval of the Cabinet Committee on Prices (CCP) that includes a set of fiscal and policy initiatives including suspension of futures trading in iron and steel and reintroduction of steel as an essential commodity.

The government hopes its carrot-and-stick policy may help in reducing steel prices. With monsoon a month away, the government expects steel demand to go down.

subhash.narayan@timesgroup.com

HERNETT, COLUMBIA & CO. INC.

© 2004 Blackwell Publishing Ltd *Journal of Internal Medicine* 255: 105–112

SATURDAY 26 JULY 2008

Adult Size 4
Deep-drawing Silverware
Silver Plated

Cement, on the other hand, has experienced little demand growth. The WPI index for cement is up 2.7% year-on-year in the current

This sets the ground for the so-called base effect. If this base is high, inflation this year would appear low; however, if the base is low, as it was before September-October 1981, inflation



See [this post](#) for a more detailed look at the data.

CLIMBING FAST

45.6 10-CENT INDEX IN ATKINS, INCREASE	33.7 RICE INDEXES OF 1900-4.5%.
30.2 INCREASE IN PRICE OF BASIC METALS ALONE	5.8 10-CENT INDEX IN PRICES OF METALS AND MINERALS

a timing between the change in direction and the reflection for review.

Miscellaneous rose over a 5.8% three-week-on-week (June 14 over June 7) with notable elements including iron ore up 3.9%. Overall, however,

Qualified fruit, wild year-on-year price effect and vegetables were

Fuel power and labor costs prices were up 3.4% while overhead prices fell 0.1%, with capital expenditures

top, a significant increase in rice and milled rice/food product prices is expected over the next 12 months.

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110

Need an alternative material for engineering application

Emergence of Plastics materials for engineering application

FRP /DMC /SMC

- Lower productivity & Recyclability

Short GF Reinforced
Thermo plastics

- Suitable for many applications, Need further enhancement in mechanical strength

LFT
(Nylon / PBT /
ABS etc.,)

- Properties closer to metal, High cost

LFT PP

- Properties closer to metal, cost economics

PP – SFT & LFT – provides solutions for metal replacement

PP - Typical Properties of mineral / glass fiber filled compound

Property	Test Method	Unit	Mineral Filled PP 40%	PPSFT - 40%	PPSFT - 40% chemically coupled	PPLFT- 40%
Density	ISO-1183	gm/cm ₃	1.18	1.24	1.22	1.22
Mould Shrinkage	ISO-294	%	0.9-1.05	0.1 - 0.3	0.2- 0.3	0.05 - 0.12
Tensile Strength	ISO 527	Mpa	36.5	95	115	115
Tensile Elongation	ISO 527	%	-	3	-	1.95
Flexural Strength	ISO 178	Mpa	52.5	140	160	178
Flexural Modulus	ISO 178	Mpa	4300	6500	8400	8450
Notched Izod Impact	ISO 180	KJ/m ²	2.5	16	15	24
HDT @ 1.820 MPa load	ISO 75	°C	110	145	163	159

Varied properties meeting many applications

Case study -1 : Washing machine

Advantages – Plastic Outer Body

- Rust proof & Dent proof
- Light weight – Easy to move
- Eliminates pressing, bending, treatments, painting, etc
- Reduces assembly operations
- Parts can be shipped for assembly elsewhere



Eliminates (compared to metal fabrication)

- 16 operations
- 7 labour
- 4 machines
- 1000 sq.ft factory area
- Inventory

Saving of 1 crore per lakh of washing machine produced

Case study -2 : Submersible pump

- Cost reduction by 50 %
- Weight reduction by 70 %
- Reduction in pump assembly time by 3 to 5 hrs.
- Consistent quality (molded - parts)
- Painting not required
- Easy handling and transportations

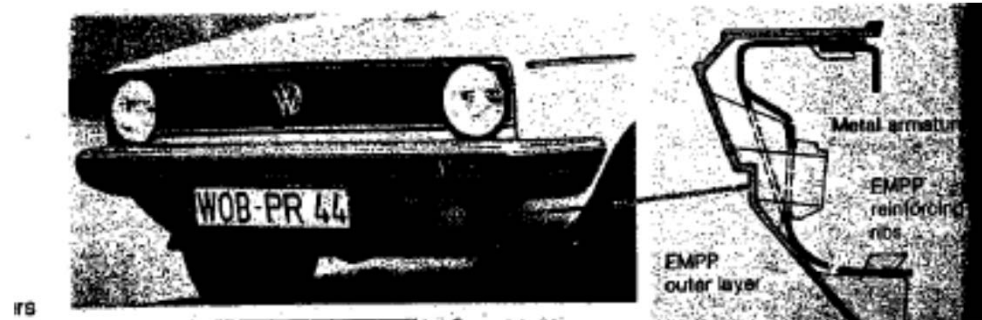


Saving of 4 crore per lakh of pump produced

Case study -3: Automotive parts

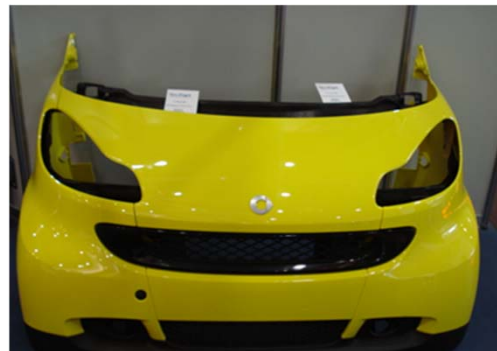
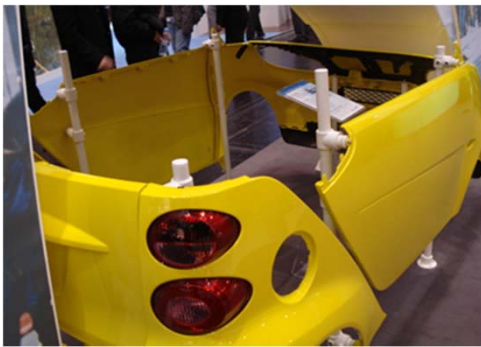
Chrome plated Metal bumper

PP bumper



First PP bumper in PP

Many metal parts conversion totaling 50 Kg presently



PP outerbody

Enormous cost economics beside energy savings

Case study -4: Ac parts

- Metal partition
- Case condenser
- Base.
- Outer metal box in split AC
- Loovers



Many parts are being in usage in India too

Miscellaneous parts

- Electrical meter box
- Valves
- Fan parts – Guard / Base
- Washing Machine parts
- Refrigerator Parts
- Automotive parts



Outdoor fan blades



Pedestal fan base

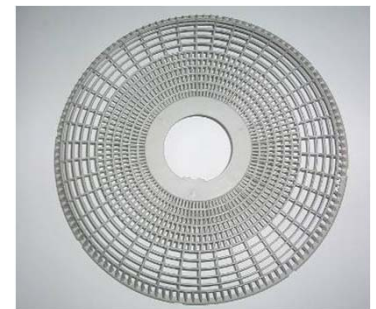


Table fan guard

Endless possibilities and applications

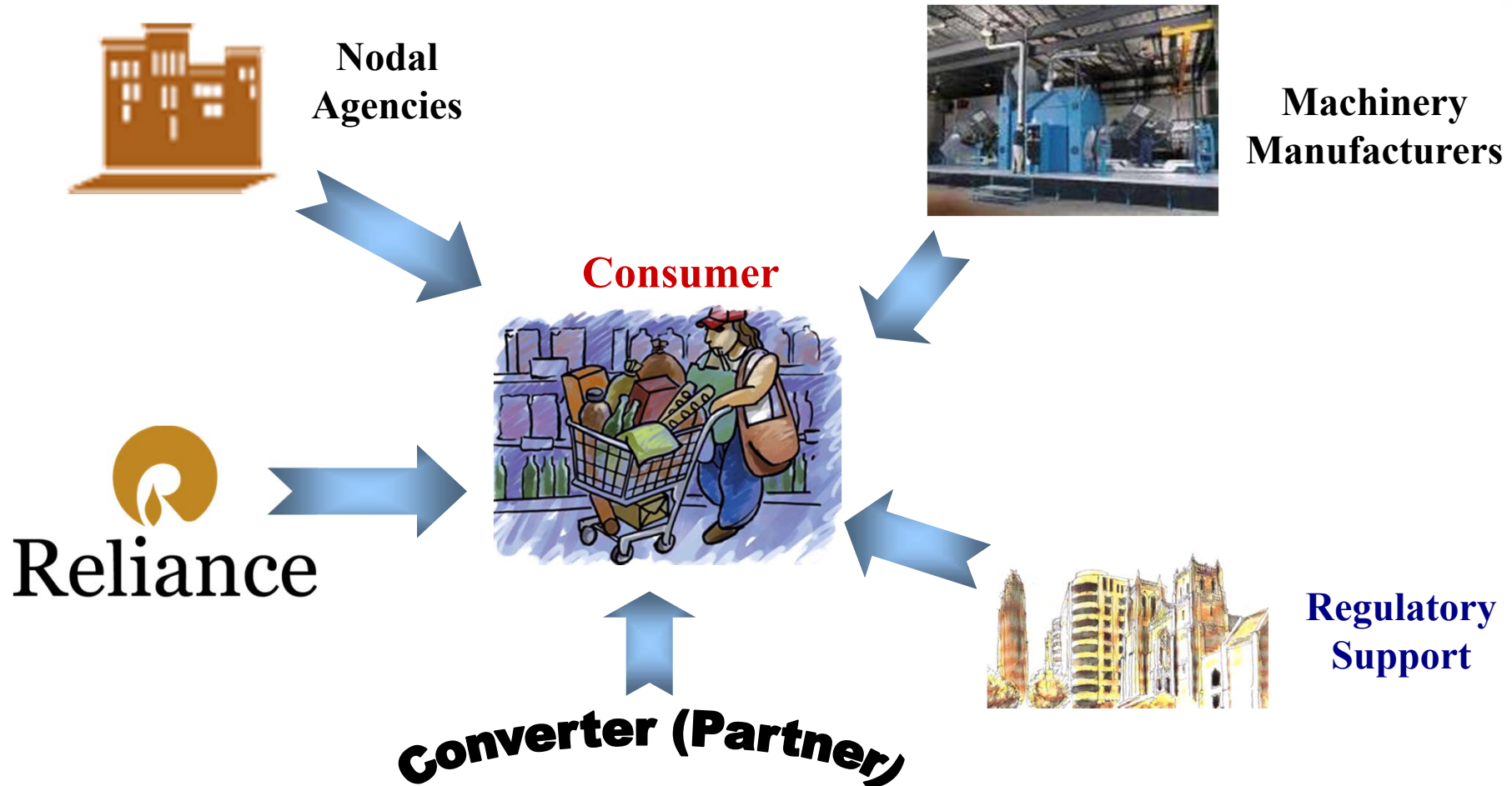
Reliance & You

Reliance – 7th Largest Producer of PP Globally
- Uninterrupted supply of material



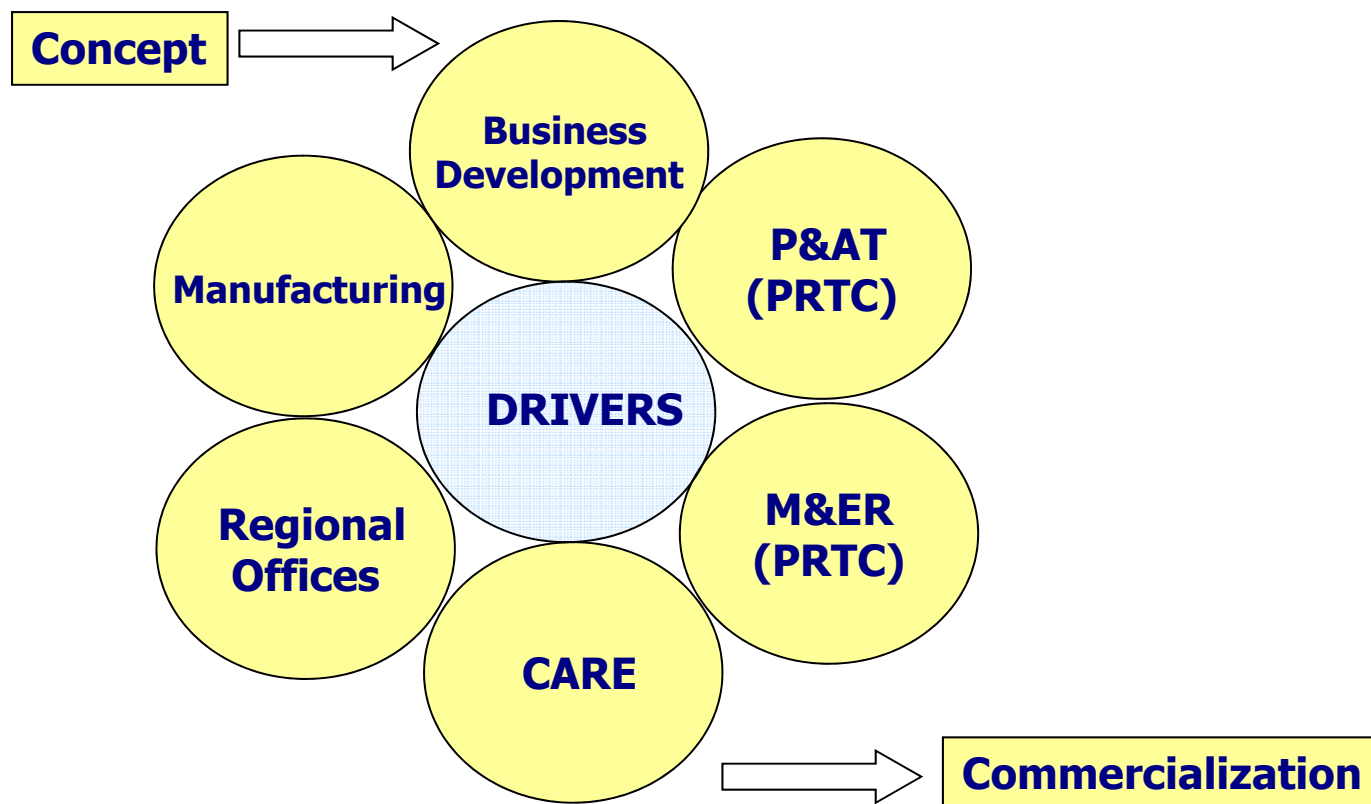
Reliance Polymers Business

Committed to Partnership – Business Development



... Dedicated efforts across the value chain for successful implementation...

Concept to Commercialization

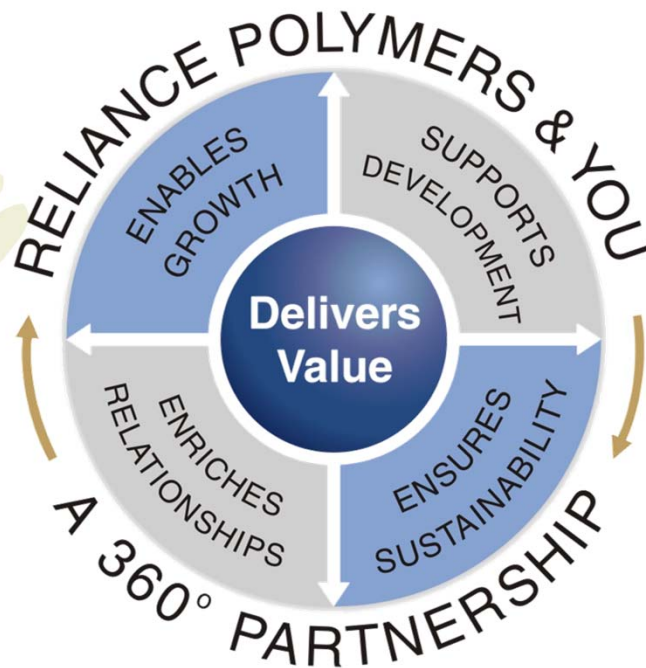


Fully integrated teams to convert “Concept” into “Practical Product”

Objectives



RISHYA
A 360° Partnership



"We Care for our valued Customers"

We conduct at least one programme every third day

Role of Reliance in Metal conversion

Audit : Common Practice in the Industry for benefits

Accounts audit

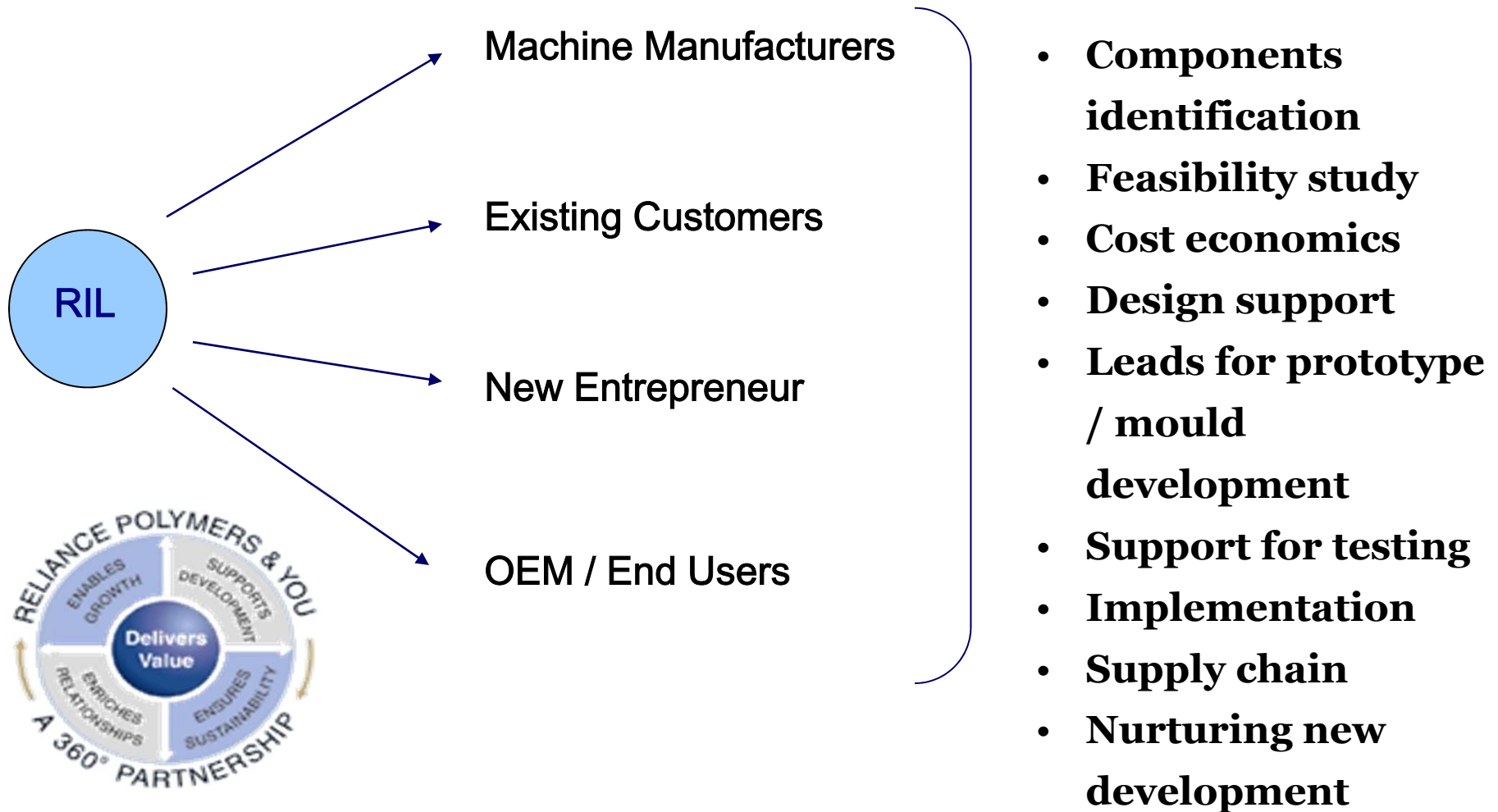
Safety audit

Environment audit

Energy audit

*Why not **Plastics audit** ? - To relook at cost effective
replacement of all possible parts*

RIL Support through “Plastics audit”



360° Support – Concept to Commercialization

Thank You