Global Container glass market

- Global Glass Packaging Market is expected to grow at a CAGR of 3.9% from 2014 to 2019 to reach a value of $60 Billion.
- Asia-Pacific region dominated the overall glass packaging market with 33% market share. Asia-Pacific is primarily dominated by China and India owing to the vast consumer base in these countries.
- Alcoholic beverage takes the topmost position in the glass packaging market with around 58.3% share by value.
- Pharmaceutical packaging application is expected to have the highest growth - CAGR of 4.2% in terms of value from 2014 to 2019.

Indian Market Overview

- At USD 14 bn, Indian packaging industry has been growing at ~ 15% over the last few years.
- Indian glass container market is estimated to be around USD 1.1 Billion and is growing at the rate of ~10% p.a. By 2020, it is poised to grow to USD 2.2 Billion.

Indian Packaging Market

- Flexible Packaging, 30%
- Rigid Plasctics, 19%
- Printed Cartons, 12%
- Metal cans, 6%
- Glass, 5%
- Others, 27%
## Container Glass Industry in India - A Profile

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Capacity</td>
<td>10,000 TPD</td>
</tr>
<tr>
<td>Revenue to exchequer per annum</td>
<td>Rs. 650 Cr.</td>
</tr>
<tr>
<td>Export in 2013-14</td>
<td>$ 172 Million</td>
</tr>
<tr>
<td>Employment in Nos</td>
<td>400,000</td>
</tr>
<tr>
<td>Investments made in last 5 years</td>
<td>Rs. 7,500 Cr.</td>
</tr>
<tr>
<td>Investments expected next 10 yrs</td>
<td>Rs. 10,000 Cr.</td>
</tr>
</tbody>
</table>

- Environment friendly & 100% Recyclable
- Non-Porous, Impermeable & Inert
Macro Fundamentals are Strong

Container Glass % Usage in End user Segment

- Liquor, 50%
- Beer, 15%
- Food, 13%
- Others, 10%
- Pharma, 12%

Per-Capita Consumption of IMFL (Litres / per Annum / Person)

- INDIAN: 4
- CHINA: 35
- THAILAND: 40
- BRAZIL: 70
- RUSSIA: 95
- AUSTRALIA: 110

Source: Anand Rathi Research

Container Glass % Usage in End user Segment

- Consumption of Container glass (Kg/Capita)
  - India: 1.8
  - Brazil: 4.8
  - Turkey: 5.5
  - China: 9
  - USA: 27.5
  - Germany: 50.5
  - France: 63.9
  - South Korea: 89

Source: Economist Intelligence Unit

Per-Capita Consumption of Beer (Litres / per Annum / Person)

- INDIAN: 2
- CHINA: 37
- US: 78
- POLAND: 100
- GERMANY: 110

Source: Beeronomics

Source: Economist Intelligence Unit

- Alco-Bev contributes 65% of Glass demand.
- Alco-Bev segment Per capita Consumption is very low compared to other countries.
- Increasing urbanisation, high disposable income and changing social ethos will boost growth opportunity end user segment.
- Increased awareness of public about health & hygiene aspects-Glass-Eco-friendly.
- Reverse Migration in Pharma has began.
Good days are back

2 Indian whisky brands Royal Stag & Officer's Choice soaked in $1 billion in retail sales

PepsiCo Inc & Coca cola investing $5 billion each during 2012-2020

Diageo taking full control over USL.

Stable Government at Centre

Beer Players - Carlsberg, Molsoon Coor, Budweiser expanding in India

Green shoots of Economic growth

Encouraging signs for Indian container glass market
End User Segment – Growth Drivers for Container Glass Industry

- Liquor Segment contributes 50% Volume & growing at 12% CAGR.
- Per capita Liquor consumption - only 4 L compared to 110 L in Australia, 95 L in Russia and 35 L in China.
- The growing proportion of nuclear families, urbanization and changing social ethos will ensure sustained demand growth for the liquor industry.
- Focus by all players on Premium segment and above.
- Strong focus on Quality and Hygiene - to reduce reuse.

Pharma
- Pharma presently contributes 12% Volume & growing at 16% CAGR.
- India is 3rd largest market in world – Volume Terms / 14th – Value terms.
- GoI has notified on 29th Sep’14, proposing ban on Plastics and PET in oral formulation – expected incremental market of 3 lacs MT per annum.
- Reverse migration to Glass has begun.

Beer contributes 15% Volume
- Beer growth @ 12% CAGR.
- Per capita Beer consumption is only 1.8 L compared to 35 L in China & 76 L in Russia. MNC like UB, Carlsberg, Sab Miller caters ~85% of the Market.
- Segment is expected to grow at robust pace due to young population, high disposable income and increased urbanization.

Food & Soft drink
- Food and Soft drinks contributes 18% Volume
- Packaged food - 15% CAGR, Juices - 35% CAGR,
- Soft drinks ~Per capita consumption is 12 L compared to global average of 92 L
- Coke & Pepsi control 95% of the market

CAGR growth source: For IMFL – Canadean For Beer & Pharma - IBEF, Food and Soft Drink - Euromonitor
Indian container glass industry working with Global players

Technology Partners

- Batch house
- Furnace distributors and Fore hearths
- Hot end equipment
- Cold end equipment
- Utilities

- PHARMA
- BEER
- FOOD
- SOFT DRINKS
- LIQUOR

Customers

- Cipla
- RANBAXY
- LUPIN
- Pfizer
- GSK
- Himalaya
- PEPSI
- COCA-COLA
- CARLSBERG
- UNITED SPIRITS
- LAMBERT
- MOLSON COORS
- SAB MILLER
- Pernod Ricard
- Radico
- Johnnie Walker
- Diageo

- Abbott
- Lupin
- AstraZeneca
- GlaxoSmithKline
- Nestle
- Traditional Foods
- Modern Foods
- United Breweries
- Molson Coors
- United Spirits
- Radico Kisteen
- Johnnie Walker
- Diageo

- ABB
- GE Jenbacher
- Siemens
- Wartsila
- IR
Glass – what & why

- Made from all natural and sustainable raw material
- Mixture of silica sand, soda-ash, lime stone and other trace elements
- Glass is 100% Recyclable and can be re-used more than 40 times
- Glass is chemically inert and pure
- Glass is “Generally rated as safe (GRAS)” and is graded safe by the U.S. Food & Drug Administration

- Every ton of glass recycled saves 322 KwH of energy, 246 kg of CO2 & 1200 kg of virgin raw material
- Helps in Savings on Waste collection, Transportation and Disposal costs
- Product packaged in glass denotes premium quality
- Suitable for high speed filling lines
- Reduces the Quantity of waste to be treated or disposed
What the consumers say across the globe ....

92% of consumers want safe drinking water and are willing to pay more for a better packaging than Plastics

60% say they are willing to pay more for more sustainable packaging as compared to plastics

72% say they want more environment friendly packaging

81% want industry to use more glass containers

Source: European Container Glass Federation (FEVE) Consumer Research
What the consumers say across the globe....

Trust Glass

Highest Quality
73% of consumers surveyed believe that glass keeps the highest quality of any container.

Most Pure
When purity is essential, 78% of consumers surveyed feel glass is best at maintaining that purity.

Truest Flavour
75% of consumers surveyed agree that glass keeps the truest taste and flavor of the product inside.

Glass has been the preferred packaging choice for food and beverages since it was first introduced.

It’s no wonder the leading food, beverage, beer, wine and spirits brands continue to trust glass containers to preserve both their products and their brand image.

Source: Newton Marketing research SAINT GOBAIN VERELLIA
Organic food and beverage manufacturers go to great lengths to ensure the quality and purity of their products.

Glass also portrays a premium image and enhances shelf appearance.

**Taste**
The fact that glass never loses purity makes it easy to see why nearly 80% of organic food consumers feel that glass is best for maintaining the true flavor and taste of their products.

**Health**
77% of organic American families feel that glass is the healthiest way to preserve foods. They also agree that healthy foods make healthy families.

**Most Appealing**
Just under 98% of consumers find the appearance of glass to be most appealing when making a wine purchase.

Source: Newton Marketing research SAINT GOBAIN VERELLIA
What the consumers say across the globe ....

**Protect your health**

<table>
<thead>
<tr>
<th>Material</th>
<th>Glass</th>
<th>Metal</th>
<th>Plastic</th>
<th>Paper</th>
<th>Plastic pouch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>20-30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td></td>
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<tr>
<td>50-60</td>
<td></td>
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<tr>
<td>60-70</td>
<td></td>
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<td></td>
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<tr>
<td>70-80</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>80-90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90-100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Glass safe**
Glass is seen as one of the containers *least likely* to leach chemicals into foods.

**Glass is green**
Glass is seen as one of the *least polluting* containers.

**Material Matters**
81% of consumers believe that the container you choose, depending on its material, can leach chemicals into the product.

**Purchase persuasion**
68% of consumer purchases are influenced by the health impact of the container housing the product itself.

Consumers are becoming more aware of packaging and how it can affect the foods and beverages they consume.

Not only do glass containers protect the flavor and purity of organics, but choosing glass demonstrates an elevated commitment to sustainability and the preservation of our natural resources.

Source: Newton Marketing research, SAINT GOBAIN VERELLIA
Do Indians prefer glass??

- Rural consumers seem to prefer glass more than urban consumers considering all aspects
- Glass is considered the best in true preservation of taste and retention of freshness
- Safety in handling is the only major issue in which glass is least preferred

75% of respondents across all categories (urban and rural) are willing to pay premium for modified glass packaging

Source: Nielsen market survey
Retail glass packaging growth

North America (11% market share)
Mature market with stable long-term growth prospect driven by increasing share of glass packaging in Beer & new consumption habits

Europe (34% market share)
- Weak growth history due to economic recession
- Showing signs of recovery in certain regions

Asia Pacific (34% market share)
Fast growing market with demand drivers being cost advantage, demographic trends, increasing income, consumerism & low penetration

Latin America (18% market share)
Fast growing market with high penetration of glass

Source: Euromonitor 2011
Global customers: wish list

What global customers look for in glass packaging...

- Zero defect
- Light weight
- Increased strength
- No contamination
- High productivity from the bottle filling lines with minimum breakage
- Competitive pricing
- World class product at competitive cost

What is required to satisfy them...

- Fully automatic inspection
- Optimized process
- State of art manufacturing process
  1. NNPB
  2. Press and Blow
  3. Advance B&B
- Controlled environment
- Better glass distribution
- Latest Technology at each step is the answer...
- World class product at competitive cost
What a 21st century container glass plant needs to have

- Advanced mould manufacturing
- Homogeneous batch feed to the furnace
- IS machines fully equipped with B & B, P & B and NNPB
- Flexibility in furnace for any colour conversion
- Fully automatic inspection machines

What Technology gives

- Reliability, Repeatability and Reproducibility in making glass bottles.
- NNPB & Advanced B&B process produce light weight glass bottles with increased strength.
- Bottle of any size (3 ml - 3200 ml) & colour can be manufactured as per customer need.
- Reduced cost of production gives global competitive edge.
- Controlled conditions with minimum manual intervention give contamination free glass bottles.

State of the art technology & process is a prerequisite to fully cater to the MNC customers
State of the art plants in India

Batch House

Forehearth

Bottle forming

Packaging

Cold End

Inspection
What it is - NNPB is a revolutionary process that not only controls the distribution of glass inside the container, but also reduces the weight of glass by 33% without having any adverse effects on the performance of the glass containers.

Advantages
- Better glass distribution throughout the bottle.
- Lighter in weight - lower consumption of molten glass.
- Lower cost.
**Advance manufacturing processes**

**Advanced Blow & Blow (ABB)**

ABB - uses AFCON & Vacuum Technology to get the benefits of Both B&B and NNPB processes

**Advantages**

- Better Glass Distribution
- Higher glass strength due to reduced metal to glass contact
- Reduction in Glass Container Weight
Glass recycling – more the better

Recycling rate ~90%

- Recycling glass decreases amount of raw materials used, lessens demand for energy, cuts CO2 emissions, extends furnace life.

- At 50% recycled glass in manufacturing, Removes 2.2 million MT of CO2 emissions = 400,000 cars off the road each year.

- Europe uses almost 70% recycled glass on the average

- Only 40% glass is recycled in India & rest goes into landfill

CONTAINER GLASS - YEAR 2011
COLLECTION RATES FOR RECYCLING RATES IN EUROPE

AVERAGE RATES
EU27: 70.28%
EUROPE (including Croatia, Norway, Switzerland, Turkey): 69.59%

>80%
60-80%
50-60%
35-50%
<35%
Net available

Source: European container glass federation (FEVE)
LCA Study on container glass in India – key findings

What is LCA?

The Life Cycle Assessment (LCA) is a tool to measure, assess and orient improvements in the environmental performance and impact of a product from raw materials through to production, use, and end-of-life phases.

Why it is important?

✓ AIGMF commissioned the study to establish a clear understanding of the environmental impact of container glass at all stages of the life cycle.

✓ The study will also help glass manufacturers to identify and investigate potential improvement opportunities for container glass packaging.

Methodology

✓ Data collected on Upstream processing, Transportation, Production & end-of-life disposal.
✓ Site visits done for 24 sites of various member companies of AIGMF.
✓ The LCA model was created using the GaBi 5 Software system for life cycle engineering, developed by PE International AG. The GaBi database provides the life cycle inventory data for several of the raw and process materials obtained from the upstream system.

The study was conducted on Cradle – to - Cradle approach which is the ultimate test in assessing the environmental impact of a product because it ensures that all aspects of a product’s life, end-of-life and reincarnation are accounted for.
LCA Study on container glass in India – key findings

- In India, only glass is being reused (30%).
- Very high landfill rate (80%) for Aluminium, Liquid carton board & pouch.
- Significant open burning for used materials in case of PET, Liquid carton & pouch leading to environment pollution & health hazard.

**End of life for packaging mediums**

- Glass is by far the most eco-friendly material while packaging is concerned.
- Shelf-life of Food & Beverages with glass container is much more than other packaging mediums.

**Glass vis-à-vis Plastic**

<table>
<thead>
<tr>
<th>Material</th>
<th>Recycling</th>
<th>Landfill</th>
<th>Open burning</th>
<th>Reuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>32%</td>
<td>38%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>PET</td>
<td>32%</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Paper</td>
<td>32%</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Aluminium</td>
<td>32%</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Liquid carton</td>
<td>32%</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Pouch</td>
<td>32%</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
</tr>
</tbody>
</table>

**Human Toxicity**

- Glass: 123
- Plastic: 246

**Terrestrial Ecotoxicity**

- Glass: 136
- Plastic: 246

**Photochem. Ozone Creation**

- Glass: 100
- Plastic: 136

**Glass vis-à-vis Plastic**

- Glass is by far the most eco-friendly material while packaging is concerned.
- Shelf-life of Food & Beverages with glass container is much more than other packaging mediums.
## LCA Study on container glass in India – Key Findings

### Effect of weight reduction & recycling on environmental profile of glass

<table>
<thead>
<tr>
<th>CML2001 - Nov. 2010</th>
<th>Weight reduction (-20%)</th>
<th>Recycling (75%)</th>
<th>Weight reduction (-20%) &amp; Recycling (75%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acidification</td>
<td>18%</td>
<td>40%</td>
<td>45%</td>
</tr>
<tr>
<td>Eutrophication</td>
<td>17%</td>
<td>37%</td>
<td>44%</td>
</tr>
<tr>
<td>Global Warming</td>
<td>18%</td>
<td>39%</td>
<td>50%</td>
</tr>
<tr>
<td>Human Toxicity</td>
<td>15%</td>
<td>15%</td>
<td>27%</td>
</tr>
<tr>
<td>Terrestrial Ecotoxicity</td>
<td>17%</td>
<td>35%</td>
<td>52%</td>
</tr>
<tr>
<td>Photochem. Ozone Creation</td>
<td>18%</td>
<td>43%</td>
<td>45%</td>
</tr>
<tr>
<td>Primary energy demand from ren. and non ren. resources</td>
<td>16%</td>
<td>31%</td>
<td>41%</td>
</tr>
</tbody>
</table>

With increased recycling & reduced weight, environmental effects of glass can be reduced by 50%.

Source: LCA report on container glass, AIGMF
LCA Study on container glass in India – Recommendations

Glass manufacturers to lower environmental effects of glass to establish glass’ green edge over other packaging mediums on human and environment impact parameters through...........

- Initiating weight reduction of glass by as much as 20% through deployment of international technologies like NNPB technology by 2015
- Power optimisation
  - Converting from furnace oil as fuel in container glass furnaces to natural gas to 50% from present 30% by the next three years. An opportunity for earning carbon credits to the tune of 1.2 million for every 10 million tonnes of production.
- Maximising cullet recycling from current all India average of 35% to 50% in 2015 with expected reduction of carbon footprint by 22%

Source: LCA report on container glass, AIGMF
### Light Weighting in FY 15-16

<table>
<thead>
<tr>
<th>Customer</th>
<th>Product Description</th>
<th>Old Weight (gm)</th>
<th>Light Weight (gm)</th>
<th>Reduction</th>
<th>Potential (Million Bottles)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bajaj</td>
<td>100 ML FLINT ADHO L/W BTL</td>
<td>140</td>
<td>130</td>
<td>7%</td>
<td>40</td>
<td>Done</td>
</tr>
<tr>
<td>USL</td>
<td>750 ml McD L/W</td>
<td>540</td>
<td>505</td>
<td>6%</td>
<td>12</td>
<td>Done</td>
</tr>
<tr>
<td>ABD</td>
<td>375ml OC BLUE LW</td>
<td>280</td>
<td>265</td>
<td>5%</td>
<td>7</td>
<td>Done</td>
</tr>
<tr>
<td>Radico</td>
<td>180ml OAB_L/W</td>
<td>165</td>
<td>150</td>
<td>9%</td>
<td>30</td>
<td>Done</td>
</tr>
<tr>
<td>Pernod Richard</td>
<td>375 ml RS BOTTLE-New Design</td>
<td>300</td>
<td>280</td>
<td>7%</td>
<td>4</td>
<td>Done</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer</th>
<th>Product Description</th>
<th>Old Weight (gm)</th>
<th>Light Weight (gm)</th>
<th>Reduction</th>
<th>Potential (Million Bottles)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>USL</td>
<td>180 ml Ramanova L/W</td>
<td>180</td>
<td>140</td>
<td>22%</td>
<td>9</td>
<td>In Progress</td>
</tr>
<tr>
<td>USL</td>
<td>750 ML GILBey L/W BOTTLE</td>
<td>530</td>
<td>475</td>
<td>10%</td>
<td>3</td>
<td>In Progress</td>
</tr>
<tr>
<td>General</td>
<td>180ml FLAT SLW</td>
<td>105</td>
<td>100</td>
<td>5%</td>
<td>6</td>
<td>In Progress</td>
</tr>
<tr>
<td>USL</td>
<td>180ml MCD NO1 whisky - ND LW</td>
<td>195</td>
<td>175</td>
<td>10%</td>
<td>17</td>
<td>In Progress</td>
</tr>
</tbody>
</table>

- **Light weighting increasing every year**
  - FY 13: -1176
  - FY 14: -5598
  - FY 15: -10496

- **In FY 15, 10% weight reduction was achieved**
Light Weighting in FY 15-16

100 ML FLINT ADHO L/W BTL

Illustration

180 ML Romanova L/W

IN PROGRESS

COMPLETED
Water footprint – Glass has minimal impact

Freshwater is a scarce resource; its annual availability is limited and demand is growing

"If measures are not taken to ensure sustainable groundwater usage, consequences for the 114 million residents of India may include a collapse of agricultural output and severe shortages of potable water,"

The map shows groundwater changes in India during 2002-08, with losses in red and gains in blue. The estimated rate of depletion of groundwater in northwestern India is 4.0 centimeters of water per year.

Matt Rodell, NASA

---

**PET**
- It takes anywhere between 1 to 2 liters to manufacture a 500ml PET bottle.

**Tetrapack**
- The water footprint for a 500ml Tetra Pak carton stands at 200 ml of water.

**Glass**
- 500 ml glass bottle will have water footprint of approx. 127 ml.

Source: www.theguardian.com/sustainable-business
CDP
Carbon Disclosure Project
• CDP is an international not-for-profit organization providing the only global environmental disclosure system.
• This enables investors, companies and governments to mitigate risks from the use of energy and natural resources and identify opportunities from taking a responsible approach to the environment.
• This provides a platform for a responding company to demonstrate their current actions and achievements and is also a means to spotlight any future plans.

SGP
Supplier Guidance Principle
• Communicate values and expectations of suppliers and emphasize the importance of responsible workplace practices that respect human rights and comply, at a minimum, with applicable environmental and local labor laws and core international conventions.

Sedex
• An innovative and effective supply chain management solution, helping to reduce risk, protect company reputation and improve supply chain practices.
Glass bottles – what next?

Weight reduction

NNPB technology enables Glass Containers to be 25% lighter and thinner.

The Glass Containers made through NNPB Technology have the same strength as compared to containers made through B&B and P&B.

Need to educate the users & customers

Strength increase

Can thermal tempering process, as followed for toughened glass, be applied to glass bottles?

Can better coatings & chemicals be applied to improve strength of the bottle?

Need more research & investment in bringing new technologies
Glass – In 21st century

Glass is not old fashioned

Increase consumption occasions with smaller sizes

Be progressive & imaginative

The glass industry still has "room for improvement"

Address value for money through sizing and multipacks

Change perception

Make benefits of glass more known to the public

Raise green profile with light weighting and communication

It is about us – it is about glass
Glass is life

“Water is pure and natural, and so is glass”
- CEO, Aguadelnacimiento

“Glass is clear, natural & it feels honest”
- Co-founder, True Fruits

“Glass is essential to ensure the unique characteristics of Jack Daniel’s”
- Master Distiller, Jack Daniel Distillery
Thank you