

# Cardia

## bioplastics™

**SCION – Bioplastics Workshop**

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## Renewable Resource Based Plastics and Sustainable Packaging



# About Cardia Bioplastics

- Australian company established in 2002
- Listed on Australian Stock Exchange (ASX code: CNN)
- Global developer, manufacturer and marketer of Bioplastics resins and packaging products as alternatives to petroleum-based plastics



# About Cardia Bioplastics

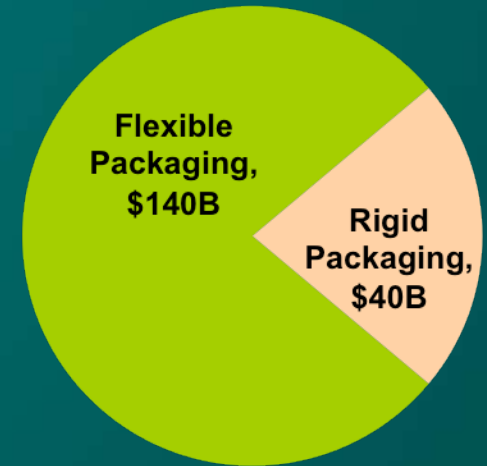
- Extensive intellectual property and patent position
- Products accredited to international standards, ISO9001 certified
- Cost-effective manufacturing in Nanjing, China
- Established global operations and distributor network
- Engaging with leading consumer goods and global packaging companies

**‘Leading Supplier of Renewable and Sustainable Resins to the Global Packaging and Plastics Products Industries’**

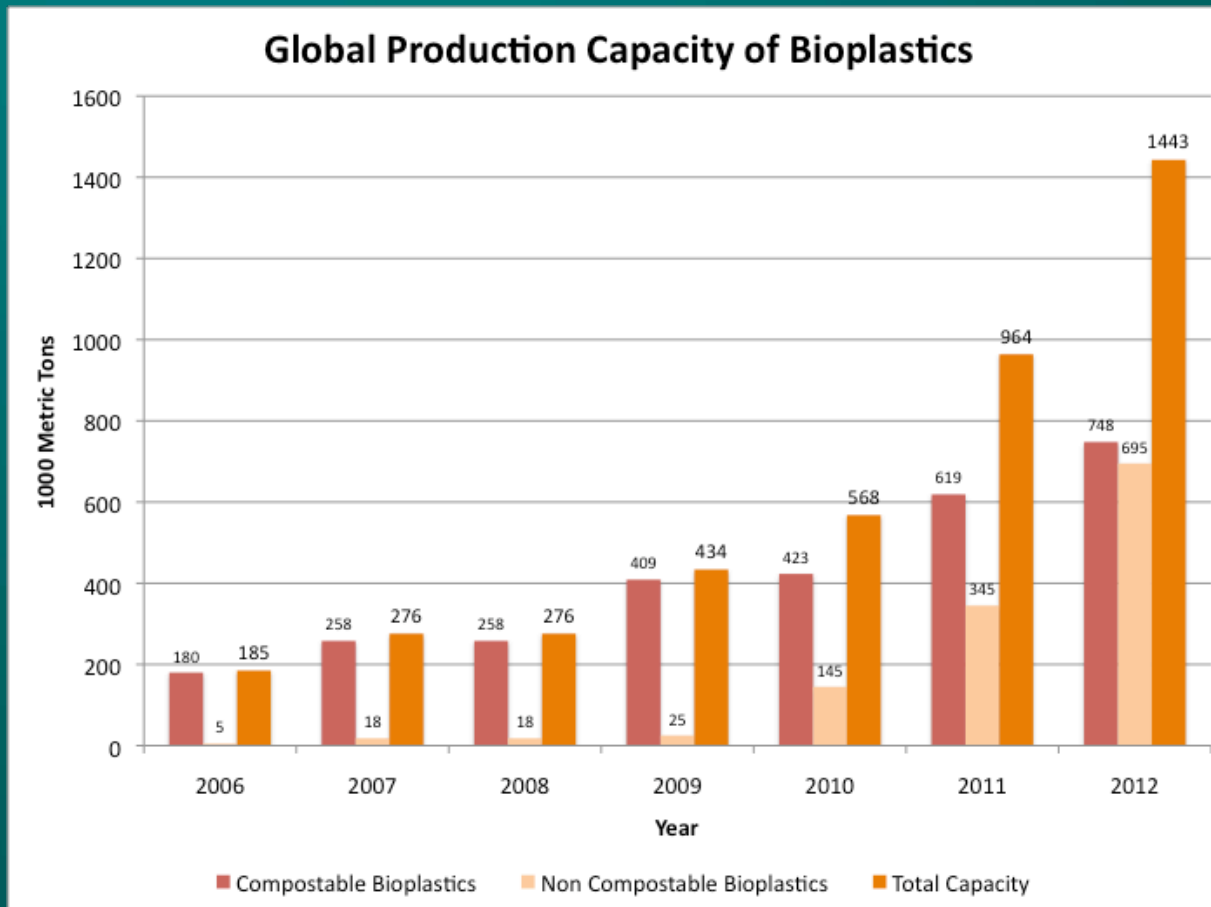


# Market Overview

- Global plastics packaging market worth \$180B in 2009
- Drivers for growth
  - Economic development, societal trends, increasing demand for convenience, decreasing household sizes
- Drivers for change
  - Made from oil – finite resource with volatile pricing, carbon footprint, green house gas emissions
  - Mostly short-term use – waste disposal and litter issues
  - Government legislation and taxes
  - Major brand owners and retailers looking for sustainable solutions
- Sustainable and renewable Bioplastics packaging estimated to be <1% of plastics packaging market with exponential growth potential



# Bioplastics Industry



# Cardia Bioplastics Product Offering

- Cardia Bioplastics resins are made from renewable resources, e.g., corn, tapioca, sugars and CO<sub>2</sub>. They are used in a broad range of packaging applications replacing traditional petroleum-based plastics
- Cardia products meet increasing demand for cost effective and ecologically sound 'green' packaging alternatives

**Cardia**  
biohybrid™

- Bioplastics resins replacing up to 66% petroleum-based content in standard packaging applications
- High performing, cost effective products
- Reduce carbon foot print and green house gas emissions

**Cardia**  
compostable

- High performing Bioplastics resins certified to international standards for biodegradability and compostability

**Cardia**  
bioproducts

- Customer service: design, development and production of ready to use film and bag products

**Cardia**  
CO<sub>2</sub>S™

- Next generation Bioplastics development. World's first biodegradable carrier bags made from CO<sub>2</sub> emissions and starch

# Cardia Bioplastics Value Proposition

- Ability to tailor resins to customer requirements from cost-effective Cardia Biohybrid resins to Cardia Compostable resins with specific functional benefits
- No additional capital required for conversion of Cardia Bioplastics resins by manufacturers

## Specialty Plastics

PA, PVOH, EVOH, PVDC

Resin price: \$(4-8)/kg

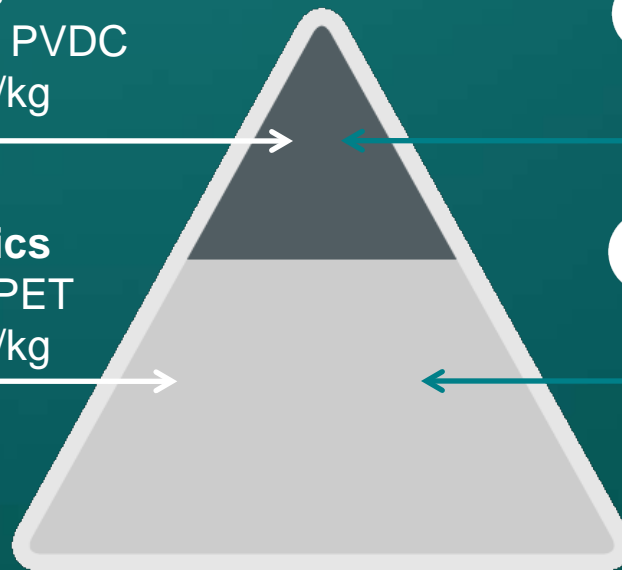
Cardia  
compostable

## Commodity Plastics

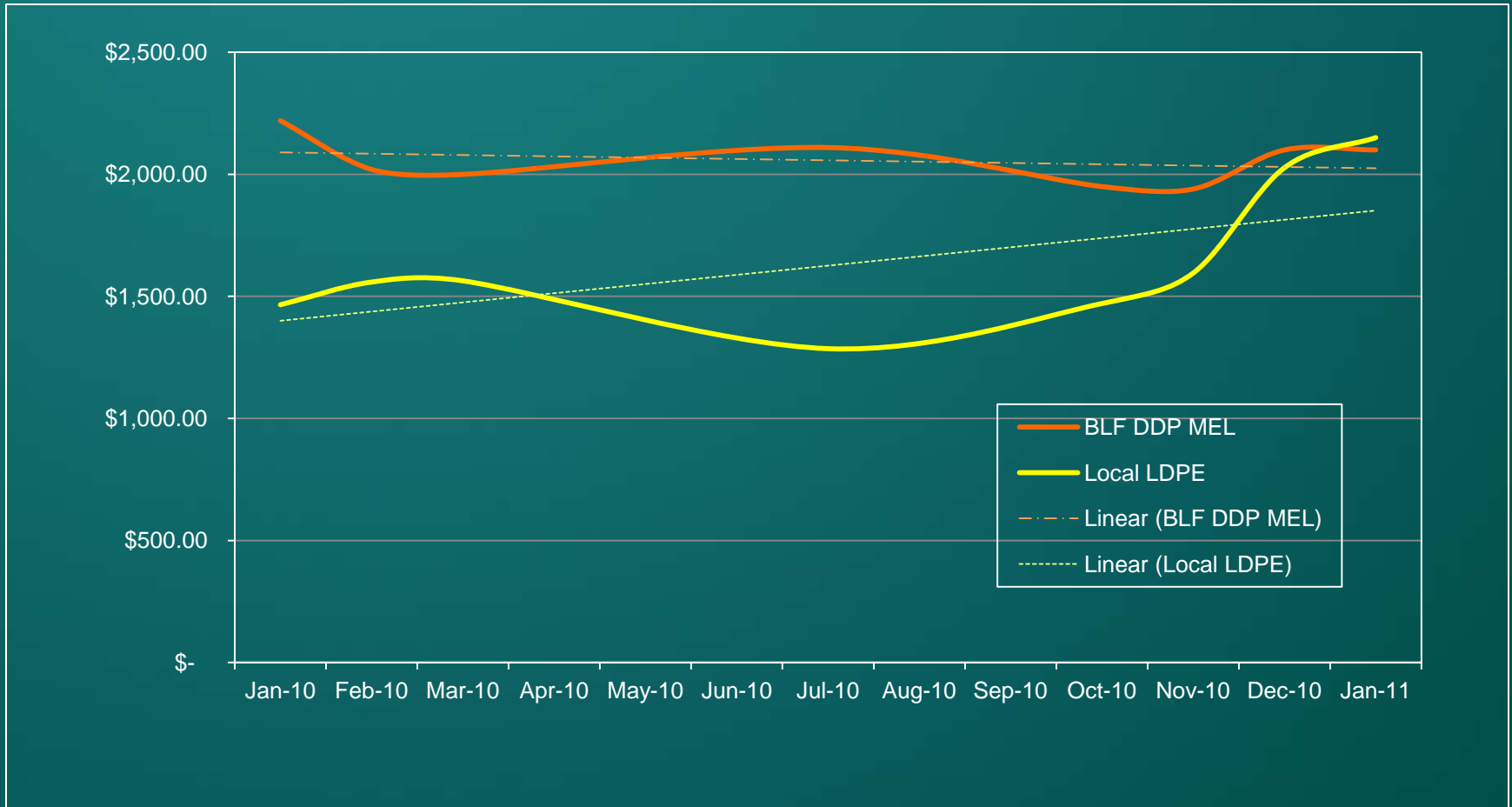
PE, PP, PS, PVC, PET

Resin price: \$(1-3)/kg

Cardia  
biohybrid™



# Cardia Biohybrid vs Local LDPE



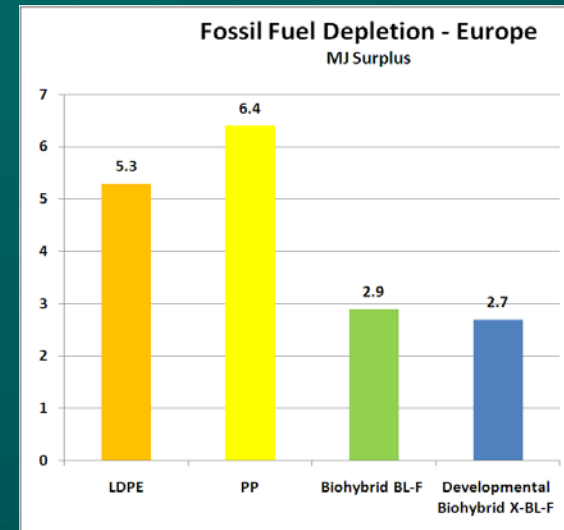
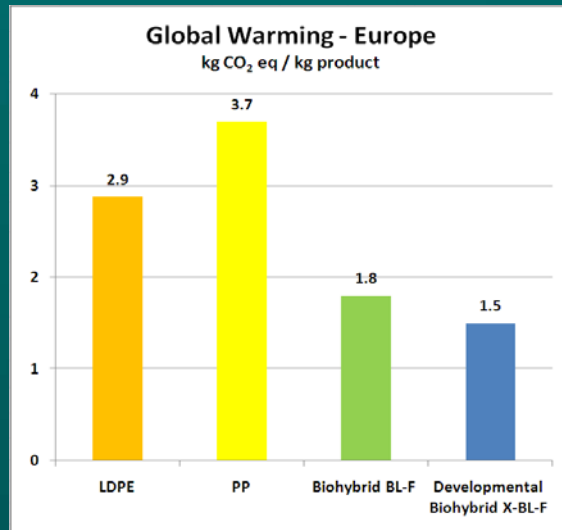
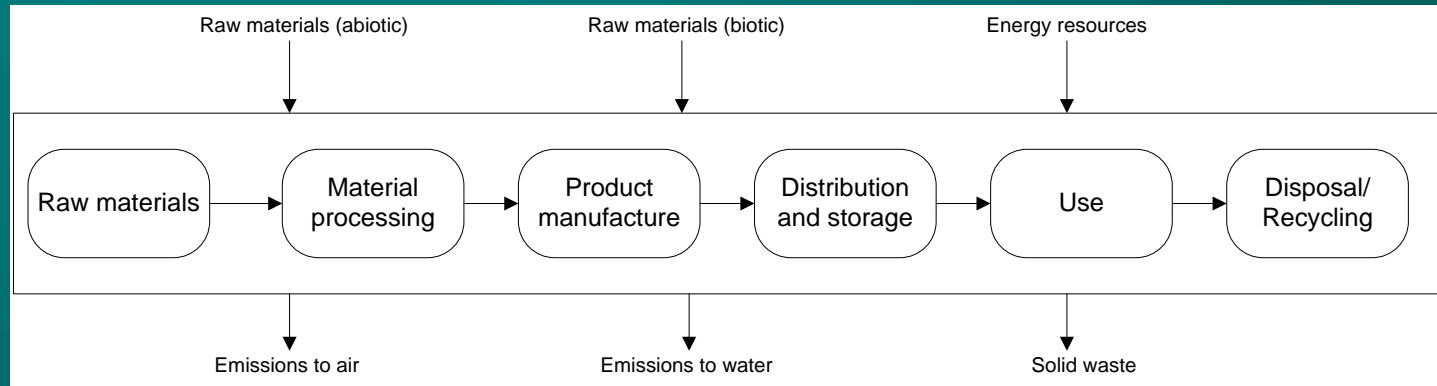
# Cardia Bioplastics Product Performance

- High-performing packaging resins with a wide processing and application window
- Global application development and support to tailor resins to customer requirements
- Broad product range covering both Cardia Biohybrid Resins and Cardia Compostable Resins
- Resin supplier for standard packaging applications and/or joint application development with leading packaging companies



**A simple, cost effective way to achieve more sustainable packaging**

# Life Cycle Assessment – Cardia Biohybrid™



# Customers and Applications

- Exclusive supply to Beijing 2008 Olympics and Paralympics
- Carrier Bags



# Customers and Applications

- Organic Waste Management Bags and Bins

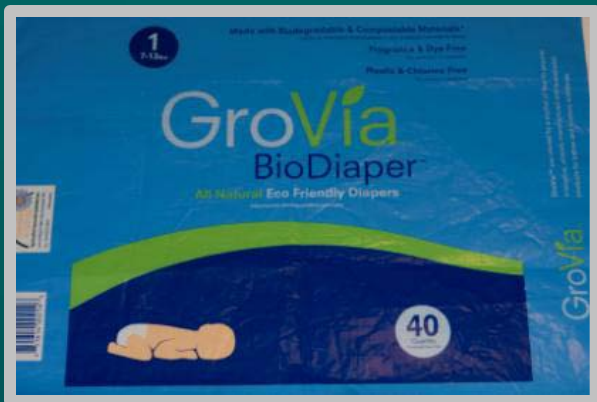


# Customers and Applications

- Protective Packaging Films, Foams and Food Packaging Films

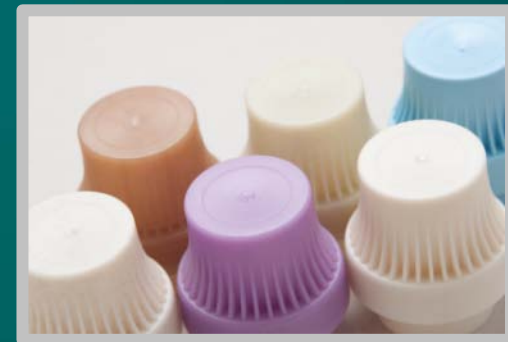


- Hygiene Packaging and Products



# Customers and Applications

- Rigid Packaging: Containers, Buckets, Bottles, Tubes, Closures



- Injection Moulded Parts and Thermoformed Trays



# Cardia Biohybrid Extrusion Blowmoldings

CardiaBiohybrid  
50% RC



HDPE

CardiaBiohybrid  
50% RC + recycle

HDPE

## Enhance Packaging Performance

- Tailor products to customer requirement
- High content of renewable resources
- Maintains packaging performance (strength, impact toughness, moisture and aroma barrier, ESCR)
- Reduces carbon foot print and GHG emissions

# Cardia Biohybrid Multilayer Films

Products with robust packaging performance

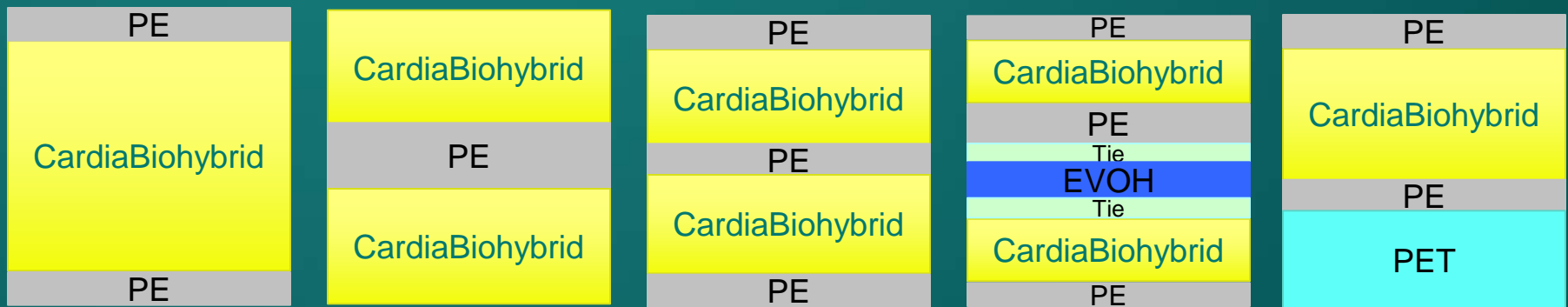


## Enhance Packaging Performance

- Tailor products to customers' performance and sustainability requirements
- Broad application window, no change with food contact
- High clarity packaging films with tailored functionality
- Excellent strength and impact toughness

# Multilayer Film Structures and Applications

Freedom to design renewable resource based multi-layer film structures to optimize packaging performance



## Enhance Packaging Performance

- High performance films
- Tailored functionality, food contact certified
- 10 – 50% renewable content
- 3 – 9 layer film structures
- Protective packaging, food packaging, pouches, barrier packaging, shrink films

# Thank You for Your Attention!

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