

# Sustainable Packaging and Demands for Bio-products

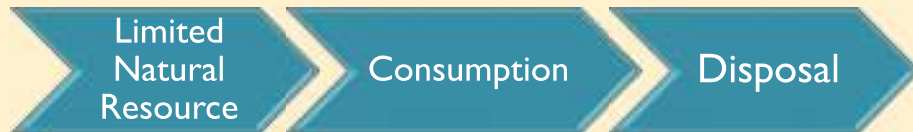
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PACKAGING IS A HUGE  
POTENTIAL MARKET  
FOR BIOPRODUCTS



## Packaging Stakeholder Goal: Move away from Linear



Many parts of the supply chain are  
demanding more sustainability in  
packaging materials

Move away from petroleum-based!



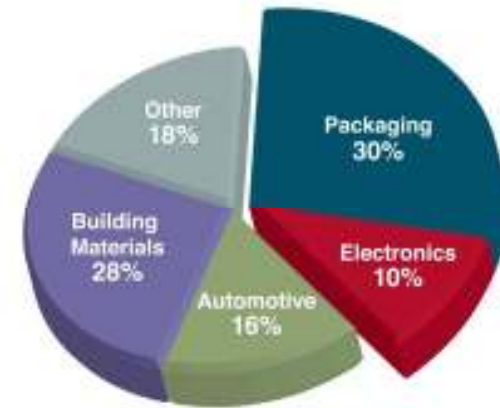
## Plastics Industry

### Greatest success story of the 20th century

- Jumped from \$100B to \$2.5T over 50 years
- Based on one feedstock: OIL
- Price of oil isn't going down
- Oil consumption rate > natural reproduction rate



## Plastic Industry Market Segmentation



## Where does this put us in the 21st century?

- Bioplastics use alternative feedstocks from renewable resources to develop plastic based on sustainable methods



## Sustainable Packaging Definition:

- Is beneficial, safe & healthy for individuals and communities throughout its life cycle
- Meets market criteria for performance and cost
- Is sourced, manufactured, transported, and recycled using renewable energy
- Optimizes the use of renewable or recycled source materials
- Is manufactured using clean production technologies and best practices
- Is made from materials healthy throughout the life cycle
- Is physically designed to optimize materials and energy
- Is effectively recovered and utilized in biological and/or industrial closed loop cycles



## WHO IS DRIVING THE GREEN WAVE TOWARD BIO-PACKAGING?



## Supply Chain Demands

- Customers
- Retailers
- Producers
- Raw Material Suppliers



NatureWorks LLC

### and what we offer



- World's leading bio-polymer player
  - 150,000 ton plant in Blair, NE
  - Engineering ongoing for a 2<sup>nd</sup> plant in S.E. Asia
  - Significant manufacturing know-how and an extensive IP position
- Jointly owned by Cargill and PTTGC
- Proprietary portfolio of Ingeo bio-polymers & intermediates
- Ingeo target: being competitive on a cost and performance basis with traditional plastics (PS, PET)
- Superior environmental characteristics
  - Lower carbon footprint, low fossil energy
  - Additional end-of-life options
- Established global market channels
  - About 100,000 ton in annual sales volume
  - Commercial partnerships with global brands

## Examples of Sustainable Packaging





Food Serviceware



13



How will Bioenergy Crops play  
in this important arena?

For more Information

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