



**ONTARIO  
BIOAUTO COUNCIL**

April 11, 2008

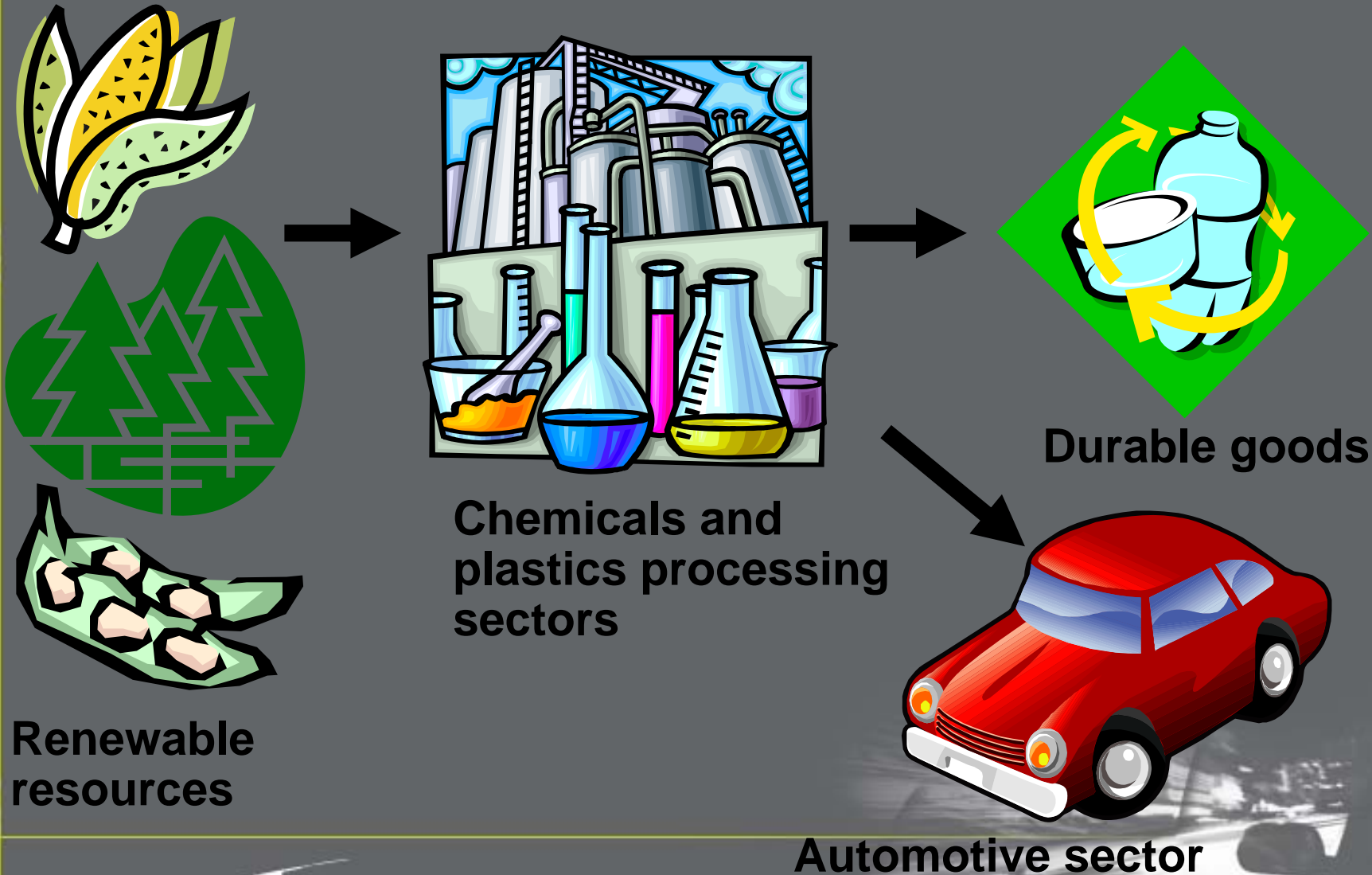
Craig Crawford, President & CEO

# Overview

- What is the Ontario BioAuto Council?
- Biomaterials – opportunities and drivers
- BioAuto Council Commercialization Fund
- Draft Proposal – Bioproducts Accelerator Centre
- Q&A



# What is Ontario BioAuto Council?



# Who is the Ontario BioAuto Council?

## Board of Directors:

- Automobile Parts Manufacturers Association
- AUTO21 Network Centres of Excellence
- Canadian General Tower
- Chrysler Canada
- Ontario Centres of Excellence
- Husky Injection Molding Systems
- Hybrid Chemistry Council
- PSA Composites
- Magna-Decoma
- Tembec
- Woodbridge Group
- Industry Canada (non-voting)
- Ontario Agri-Food Technologies

## Members:

- Canadian Plastics Industry Association
- DuPont Canada
- Ford Canada
- Ontario Soybean Growers
- Innovation Ontario North
- Southwestern Ontario Bioproducts Innovation Network
- University of Toronto, Centre for Biocomposites and Biomaterials Processing
- University of Guelph
- Syngenta Canada
- Sarnia BioIndustrial Park
- Valle Foam
- GreenCore Composites



# BioAuto Council Vision

To position Ontario as a global leader in the manufacture of automobile parts and related materials from agricultural and forestry feedstocks by the year 2010



# BioAuto Council activities

- Investment attraction – biopolymer production
- Communications – [bioautocouncil.com](http://bioautocouncil.com)
- Government policy
- Research and development – assessment and strategic direction
  - Private and public research
  - How to build the R&D infrastructure needed to drive innovation in Ontario
- Commercialization fund



# Biomaterials – the opportunities

## FEEDSTOCK

STARCH

VEGETABLE  
OIL

CELLULOSE &  
HEMI-  
CELLULOSE

LIGNIN

FIBRE

## BASIC MATERIALS

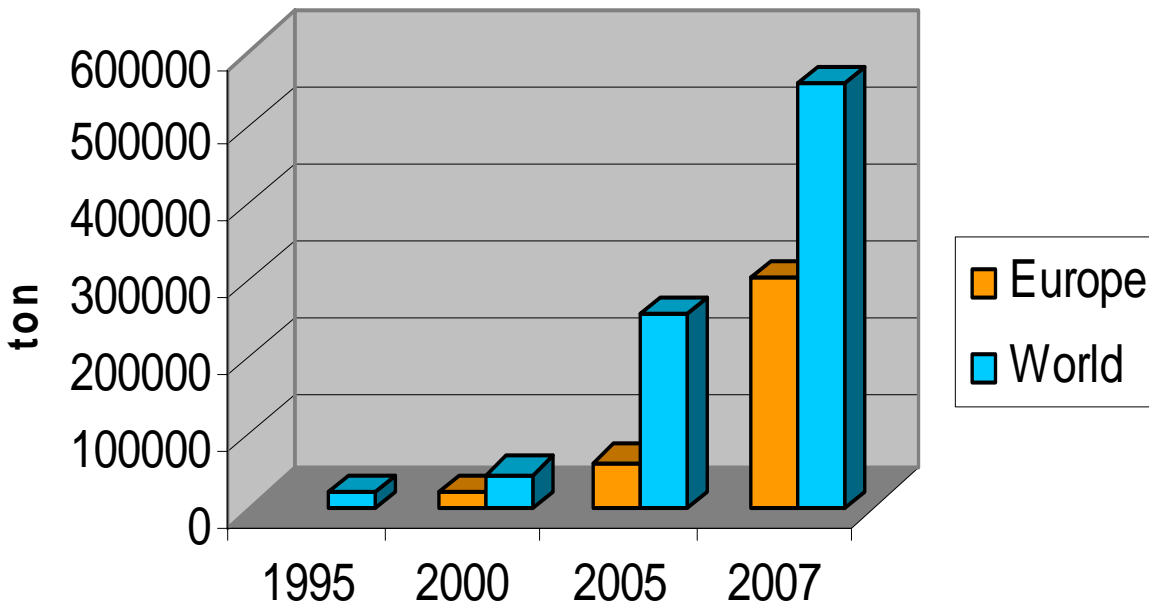
RESINS

FOAMS

COMPOSITES



# Biomaterials - opportunities



Forecasted  
Market \$50  
billion (USD) by  
2015

Forecasted  
consumption  
4 million ton by  
2010

At present Europe represents 40% of global bioplastics consumption

Source: Norocon Innovation Consulting Kaeb, Denmark.  
The Bioplastics Industry in Europe

Source: Biopolymers from crops:  
Proceedings of the Australian Agronomy Conference

# Biomaterials – automotive opportunities



27 components  
43 kg bio-  
parts:  
door & pillar  
inners,  
head liner,  
rear cargo shelf  
& trunk  
components,  
thermal  
insulation &  
isolation mats

Mercedes S-class



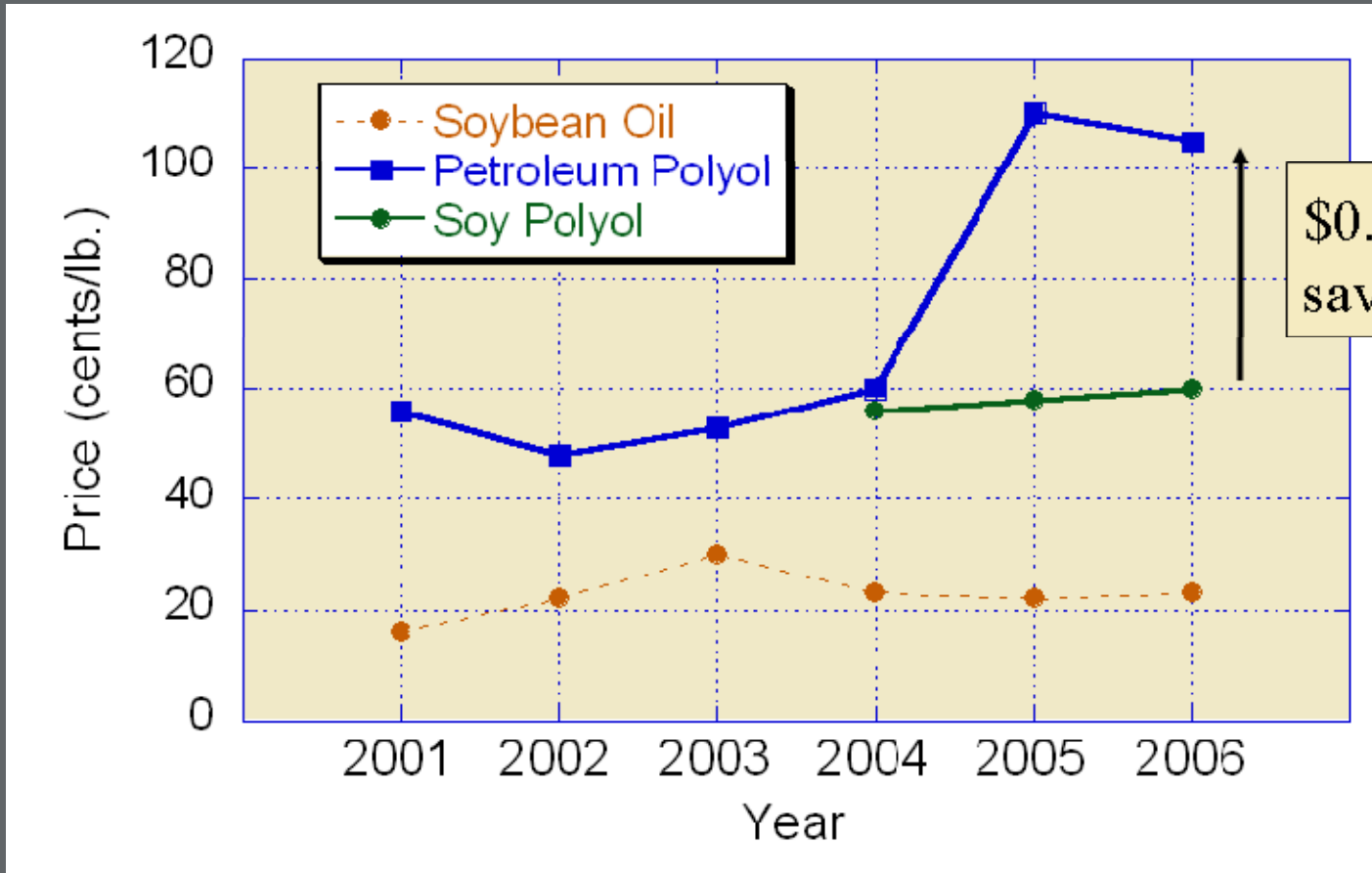
# Foam - soy polyol

- Functionalized soybean oil used in reaction with isocyanate to form urethane linkage
- There is approx. 30 lbs of foam in a vehicle
- Flexible Foam
  - Seat Cushion
  - Seat Back
  - Headrest
  - Armrest
  - Headliner
- Rigid Foam
  - Package Tray
  - Bumper fascia



© eVox Productions

# Soy polyol pricing



Source: OmniTech International

# Other Resins (examples)



- Poly-Lactic Acid (PLA)
- Thermoplastic starch
- PHA/PHB

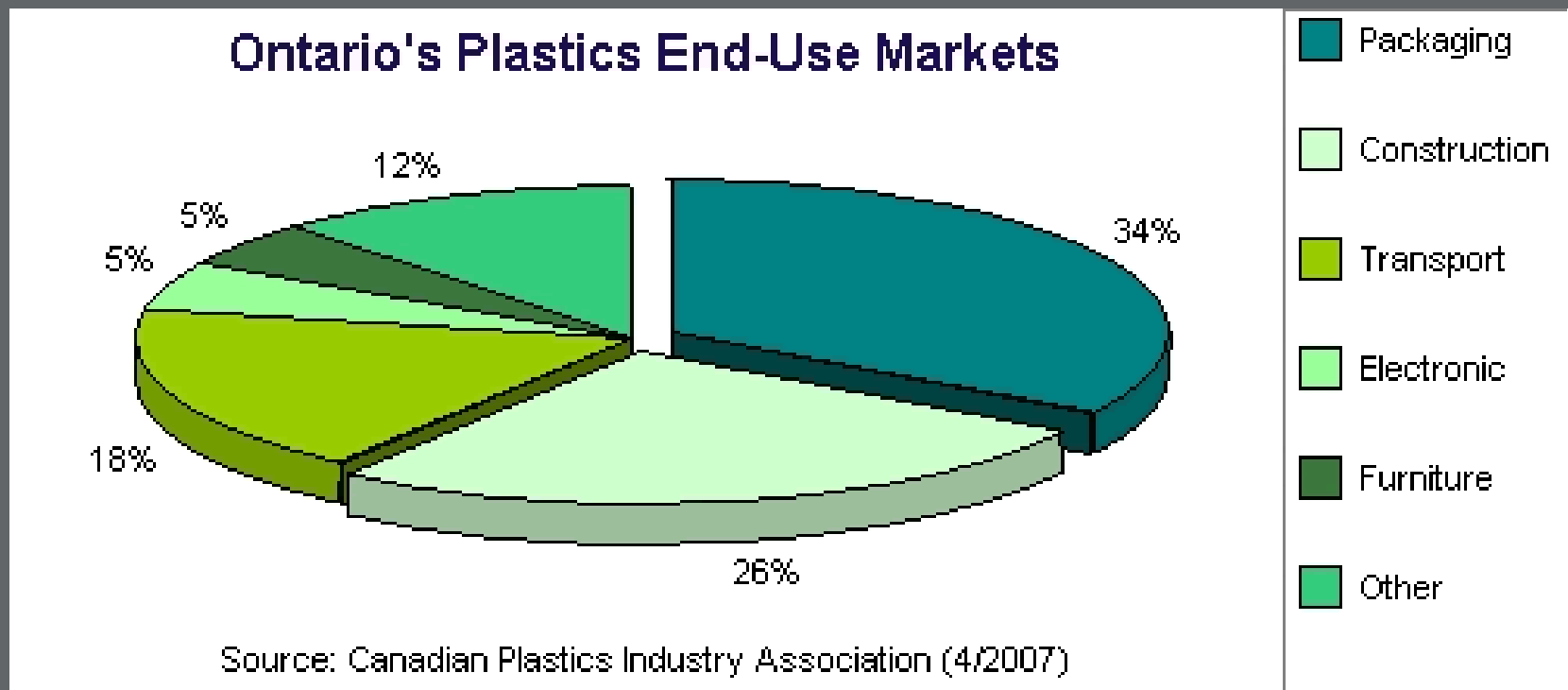


- Fibre sources
  - Wood, cereal straw, corn/soy refuse, milling byproducts, hemp, flax
- End products
  - Fibreboard, “fibre-glass” replacement, yarn, clothing, carpets, decking, shingles
- Market sectors
  - Textiles, construction, automotive, furniture



# Focus is on biomaterials

- Transportation is actually the third largest plastics market



# Biomaterials - drivers

- Competitive pricing of plant-based products versus petroleum products
- Weight-reduction (automotive)
- Reduced environmental footprint
- Increased use of renewable feedstocks and agricultural products
- Marketing differentiation





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Commercialization Fund

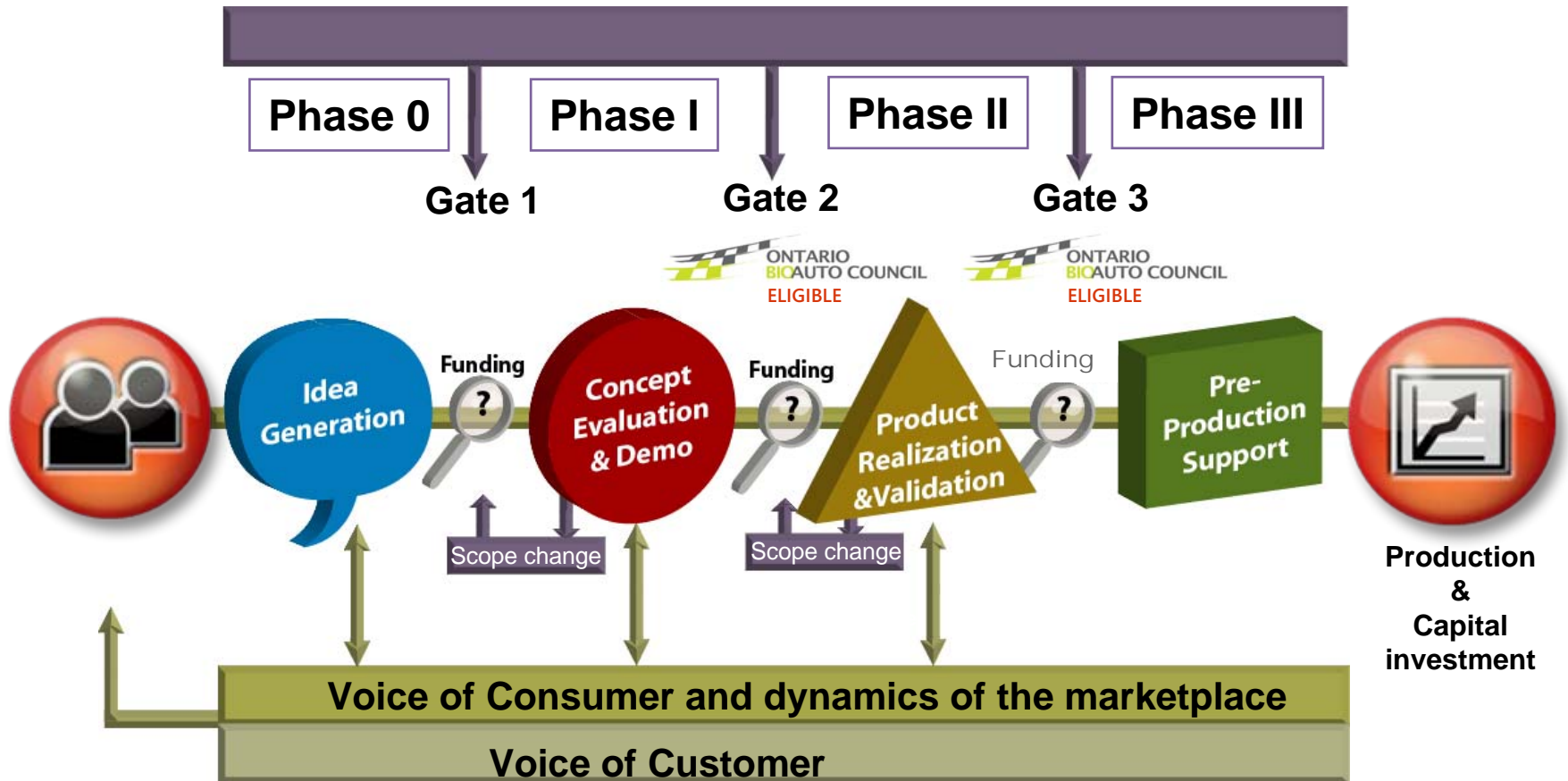
[www.bioautocouncil.com](http://www.bioautocouncil.com)

# \$5-million for commercialization activities

- Targets biomaterials production and processing - for-profit Ontario companies only
- Grants or repayable loans to a maximum of \$1-million
- 50% matching contributions required – where 25% can be in-kind
- 60-day service guarantee



# Ontario BioAuto Investment Fund Commercialization Process





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# Bioproducts Accelerator Centre

Draft - For discussion purposes only

# Bioproducts R&D (examples)

- University of Toronto, Centre for Biocomposites and Biomaterials Processing: Dr. Mohini Sain
- Premier's chair in biomaterials and transportation: Dr. Amar Mohanty, University of Guelph
- Ontario BioCar Initiative
  - \$18M, 4-year project involving the universities of Guelph, Waterloo, Toronto and Windsor and industry



# Low Cost Biomaterials

Petrochemical commodity plastics ~ 90 to 100 cents / lb.

		Ag Residue	Biofuel co-product	Forest biomass	Energy crop
Hemp	~ 15+ cents / lb				✓
Lignin	~ 10 cents	✓		✓	
Soy meal	~ 10 cents	✓			
Wood flour	~ 6 – 10 cents			✓	
DDGs	~ 5 cents		✓		
Glycerol	~ 5 cents		✓		
Wheat Straw	~ 3 cents	✓			
Corn Stover	~ 3 cents	✓			
CO <sub>2</sub> (from fermentation process)	~ 0 cents		✓		

# Low Cost Recycled Polymers

Petrochemical commodity plastics ~ 90 to 100 cents / lb.

Recycled PET

~ 50 cents

Auto shredder residue  
(PP + PU)

Negative value (landfill)



# Performance Fibres / Processes

- Fibres (examples):
  - Micro-fibres –  $\sim 1x$
  - Nano-fibres -  $\sim 2x$
  - Carbon-fibres -  $\sim 3x$
- Second generation plastics processing technology (examples):
  - Oriented extrusion technology  $\sim 4-6X$
- Up to 30% reduction in raw material use possible through use of performance fibres!



# Stem Biomass Available From Major Ontario Crops

Crop	Stem Material (t/ha)	Recoverable Stem Biomass (t/ha)	Total Recoverable Stem Biomass (t)
Corn	7.4	5.2	3,315,000
Soybean	2.5	2.2	1,800,000
Wheat	8.0	6.0	2,880,000
<b>TOTAL</b>			<b>7,995,000</b>

Source: Zena Ng, Leonardo Simon, Larry Erickson, Presentation submitted for WPC 2008, San Diego CA, March 31 – April 2, 2008



# Ontario Kraft Pulp Mills

Market Pulp Capacities (tonnes per year)		
	Softwood	Hardwood
Fort Frances	290,000	
Dryden	50,000	80,000
Thunder Bay	360,000	230,000
Terrace Bay	310,000	
Marathon	190,000	
Espanola	100,000	
<b>TOTAL ONTARIO</b>	<b>1,300,000</b>	<b>310,000</b>
<b>Estimated hemicellulose and lignin "waste stream" (120% of pulp capacity)</b>	<b>1,560,000</b>	<b>372,000</b>

Source: Tom Browne and Andy Garner, Opportunities for Collaboration Between Forest and Chemical Industries, Sarnia, February 12, 2008

# Proposed OBAC Accelerator Centre

- A bridge between \$18M Ontario BioCar Research Initiative and the auto industry (e.g. research and engineering facilities, companies)
  - ~ \$25 – \$30M over 5 years
  - Major focus on bio-polymers, bio-composites
  - OBAC owned and governed (rented industrial facility, no glass palace)
  - Commercial scale-up from lab bench – fills an existing gap
  - Industry-driven projects linked to OBAC Commercialization Fund



# ....continued

- University-industry co-location and shared use of assets
- Mix of entrepreneurs, SMEs, MNEs and world-class HQP
- Balance of basic and applied research with view to commercialization
- Second generation plastics processing equipment
- IP ownership proportional to investment (knowledge, financial)
- Located in Guelph area, central to plastics and automotive industry, but with possible nodes in other provincial locations depending upon need



# Links to Innovation Networks

- **Access to technical knowledge, global competitive intelligence, partners, projects....**
  - National Research Council (NRC)
  - Ontario Centres of Excellence (OCE)
  - AUTO21
  - FP Innovations
  - Hybrid Chemistry Council
  - Regional Convergence Centres
  - Regional Innovation Networks (RINS)
  - Other Centres (e.g. Composites Innovation Centre in Winnipeg, Alberta Research Council)



# SME Support Services

- “From mind to market” approach
  - OBAC Accelerator - access to equipment, project funding, experts
  - Bioenterprise / MaRS – business plans, mentorship
  - VC Funds – MRI VC Fund, Agri-Opportunities Fund, MaRS, etc.
  - OCETA – industry standards setting, product performance verification
  - Government procurement – field trials, public showcase



# OBAC Accelerator Centre - Benefits

- **Products**
  - New products
  - Lower price
  - Improved performance
  - Not in competition with food/feed or traditional forestry products
  - Reduced time to market
  - Lower GHG and toxic emissions
  - Recyclable, recycled
- **Companies**
  - Improved competitive position
  - SME creation
- **Communities**
  - New markets for ag and forest biomass
  - Regional cluster development
  - Wealth creation



Thank You

Questions?

