Bioindustrial Innovation Canada
Creating jobs and economic value sustainably

Bioeconomy of Eastern Ontario Symposium
August 31, 2017

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Bioindustrial Innovation Canada
Sarnia, Ontario
Industrial History of Sarnia-Lambton [1858 – 1998]
Emergence of the Sarnia Chemistry Cluster over 140 years
Strategic Advantage of the Sarnia Chemistry Cluster
Ready access to North American Markets

Key benefits of area:

- Just-in-time daily delivery capability
- Industrial Heartland of North America – 52% USA GDP within 10 hours trucking
- Secure raw material supply through excellent logistics options
- Availability of highly skilled labour and personnel
- Excellent cooperation within region between companies, government and labour
Transitioning to a Low Carbon Economy
Sarnia-Lambton has abundant agricultural feedstocks

Located within Ontario’s Agricultural Heartland
– 45% of soybeans and corn within 100km

Five County Region around Sarnia
– corn yields comparable to Iowa
– more than 1 million bone-dry tonnes sustainably harvestable corn stover available (2009)
Sarnia-Lambton Hybrid Chemistry Cluster
Supported through a collaborative ecosystem

Sarnia-Lambton Economic Partnership:
Community and municipality economic driver providing local contact

Sarnia-Lambton Research Park:
Providing assets (laboratory and pilot plant space) for business incubation

Lambton College:
Providing access to applied research capability and highly qualified people

Bioindustrial Innovation Canada:
Business accelerator providing critical investment, advice and services

Industrial Parks:
Access to cost effective infrastructure and services for commercialization
Sarnia-Lambton Economic Partnership
Facilitating the transformation of the community

Sarnia-Lambton Economic Partnership:
• Local driver of economic development
• Provides information and connectivity to the community

Development of Strategic Plan:
• Community in crisis (2000)
• Coalesced community views
• Facilitated creation of strategic plan
• Lead implementation of the plan

Workforce Development:
• With local partners, assessed workforce needs for the future of Sarnia-Lambton
• Focus on entrepreneurship
• Partnership with Lambton College

Lambton County
Comprised of eleven municipalities, the largest being the City of Sarnia
population: 126,000

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Michigan
USA
Western Sarnia-Lambton Research Park
Created in 2002 through commitment of Lambton County

Accommodates research and development by providing laboratory and piloting space to incubate technology innovation
Industrial Parks
Enabling lower cost commercialization of SME’s

**Bioindustrial Park Sarnia:**
- Former site of Polysar Corporation
- Brownfield lands available from shutdown and demolition of five major production units
- Access to wastewater treatment, water (process and fire), logistics and site infrastructure

**Bluewater Energy Park:**
- Former site of DOW Canada
- Purchased by TransAlta Corporation
- Brownfield lands available from shutdown and demolition of all DOW Canada production assets in Sarnia
- Access to competitively priced steam and power, water (process and fire), logistics and site infrastructure
Lambton College Applied Research
Provides innovation capability for the cluster

Other Research Groups
- Advanced Process Control Research Group
- Nano-Engineering Research Group
- Information Technology Research Group

2016-2017 Performance Data
- Research revenue: $14,421,288
- Faculty researcher: 44
- Projects: 111
- Partners: 153
- Paid research students: 144

Bioeconomy of Eastern Ontario, August 31, 2017
Bioindustrial Innovation Canada
Accelerating commercialization of clean technologies

Vision:

Creating jobs and economical value sustainably for Canada

Mission:

*Bioindustrial Innovation Canada provides critical strategic investment, advice and services to business developers of clean, green and sustainable technologies. Our expertise in commercialization builds a stronger Canada.*
Bioindustrial Innovation Canada
Strategic Pillars

Cluster Builder:
• Build a strong hybrid cluster in Sarnia-Lambton
• Create strong partnerships with Colleges and Universities
• Integrate cluster model into additional Canadian communities

Critical Strategic Investment Fund:
• Raise risk capital for clean, green and sustainable startups
• Invest in start up companies with high potential for success
• Use BIC talent and connectivity to accelerate success and profitability

Strong Leader for Commercialization:
• Provide commercialization advise and services
• Increase awareness and understanding of successes
• Provide leadership for sustainability (LCA, GHG reduction, water reduction and quality)
Integrating into the Hybrid Chemistry Value Chain
Opportunity for renewable resources to commercialize

Bio-based Feedstock
- Ethanol
- Butanol
- Biodiesel
- Cellulosic sugars
- Oils

Fossil-based Feedstock
- Fuels & Energy
  - Ethanol
  - Butanol
  - Biodiesel

Primary Chemicals
- Polymers & Chemicals
  - Succinic acid
  - iso-Butanol
  - Levulinic acid
  - Lignin

Processed Biomass
- Lignin
- NCC
- Natural fibres

Fuels & Energy
- Bio-Jet fuel

Advanced Manufacturing
- PLA
- Butanediol
- Carbon Fibre
- PET
- Ecosphere™

Finished Products

Consumer

Low Value Added
High Value Added
Bioindustrial Innovation Canada
How we support commercialization

Bioproduct AgSci Cluster Initiative ($10 million, 4 years):
• Funded through Agriculture and Agri-Food Canada (AAFC)
• Support R&D of bioproducts with a benefit to agriculture
• Strong focus on achieving milestones leading to commercialization

Centre for Commercialization of Sustainable Chemistry Innovation (COMM SCI) ($27 million, 4 years):
• Funded through FedDev IRD ($12 million) and MRIS ($3 million)
• BIC, partners and participants provide $12 million matching funds
• $11 million investment fund for startup companies
• $16 million for commercialization support activities
  Applied research for eliminating technology barriers
  Access to plug and play facilities for pilot and demonstration plants
  Access to technical services to resolve supply chain and market barriers
  Access to networks and engineering resources to support commercialization
  Financial support through access to project funding
Raw Material Sourcing Anchors Growth of Clusters
Converting corn stover & wheat straw into sugars

**Vision Created and Project Launched:**
A profitable and sustainable agricultural biomass to end-products supply chain by 2020

**Target:**
Construction of a cellulosic sugar conversion plant in Sarnia by 2018 processing 75,000 tonnes of agricultural residue

**Process and Outcomes:**
19 technology providers screened vs. decision criteria and recommendations given to Cellulosic Sugar Producers Co-op

CSPC partnering with Comet BioRefining to create agricultural biomass supply chain and commercialize first cellulosic sugar facility
Investment Decisions Support Sarnia-Lambton
Announced investments of $2 million in Sarnia-Lambton

BIC Invests In Comet Biorefining
BY LEE MICHAELS  MARCH 1, 2017 1:16PM
Comet Biorefining has received another shot in the arm as it moves to build a new $70-million manufacturing plant on the TransAlta site in Sarnia by 2018.

Bioindustrial Innovation Canada (BIC) Executive Director Sandy Marshall says they’ve made a $500,000 equity investment in the London-based company.

“This is about the ongoing development of the hybrid chemistry cluster in Sarnia-Lambton and this is the next piece in the puzzle after BioAmber,” says Marshall. “We reviewed a lot of different companies that had various technologies to convert corn stover and wheat straw into sugars, and the Comet technology was one of the better technologies we saw. We

California company expected to build demonstration plant in Sarnia
By Paul Monty, Sarnia Observer
Wednesday, June 14, 2017 2:17:37 EST PM

Bioindustry Innovation Canada
A Sustainable Chemistry Alliance
Sarnia-Lambton Hybrid Chemistry Cluster [2017]
Canada’s First: Building out in southwestern Ontario

**Fossil-Based**
- Air Products
- Cabot
- CF Industries
- DuPont
- HC Stark
- Imperial Oil
- Arlanxeo
- NewAlta
- NOVA Chemicals
- Pembina
- Plains Midstream
- Praxair
- Royal Dutch Shell
- Styrolution
- Suncor Energy
- TransAlta Energy
- TODA

**Bio/Renewable**
- BioAmber
- BIOX
- Cargill
- Cellulosic Sugar Producers Cooperative
- Comet Biorefining
- Enbridge (solar)
- FORGE Hydrocarbons
- GreenCore
- Greenfield Specialty Alcohols
- Origin Materials
- S2G Biochem
- Suncor Ethanol
- Ubiquity Solar
- Woodland Biofuels

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Sarnia-Lambton Hybrid Chemistry Cluster
A model to replicate across Canada

Canada’s existing chemical industry in Sarnia forms the foundation for the Cluster:

- access to energy, skilled labour and highly qualified personnel
- pipelines, rail, road and water transportation options for raw materials and finished products
- ready access to North American markets
- local Colleges, Universities and Research Parks active in development

Support of Ontario’s farmers and foresters to provide the needed biomass

Start-up bio-based and sustainable chemistry companies bringing innovation to full commercialization

Existing chemical industry develops brownfield land for new businesses:

- primary chemical building blocks from bio-based sources
- polymers, advanced chemicals/fuels and materials
- biofuels and chemicals production from local CO$_2$ sources
- energy generation from low value biomass sources
Eastern Ontario Bioeconomy and Chemistry Base
Can this grow into a hybrid chemistry cluster?

**Fossil-Based**
- Airgas
- Cardinal Power
- DuPont
- Dyno Nobel
- Evonik
- Invista
- Pirelli Power Cables
- P&G

**Bio/Renewable**
- Ferguson Tree Nursery
- Greenfield Specialty Alcohols
- Ingredion
- Masterfeeds
- REInc
- King’s Lock Distillery
- V6 Agronomy
- Windmill Brewery
Thank you - Discussion