

# Innovation, Science and Technology at work for the rural communities of Eastern Ontario

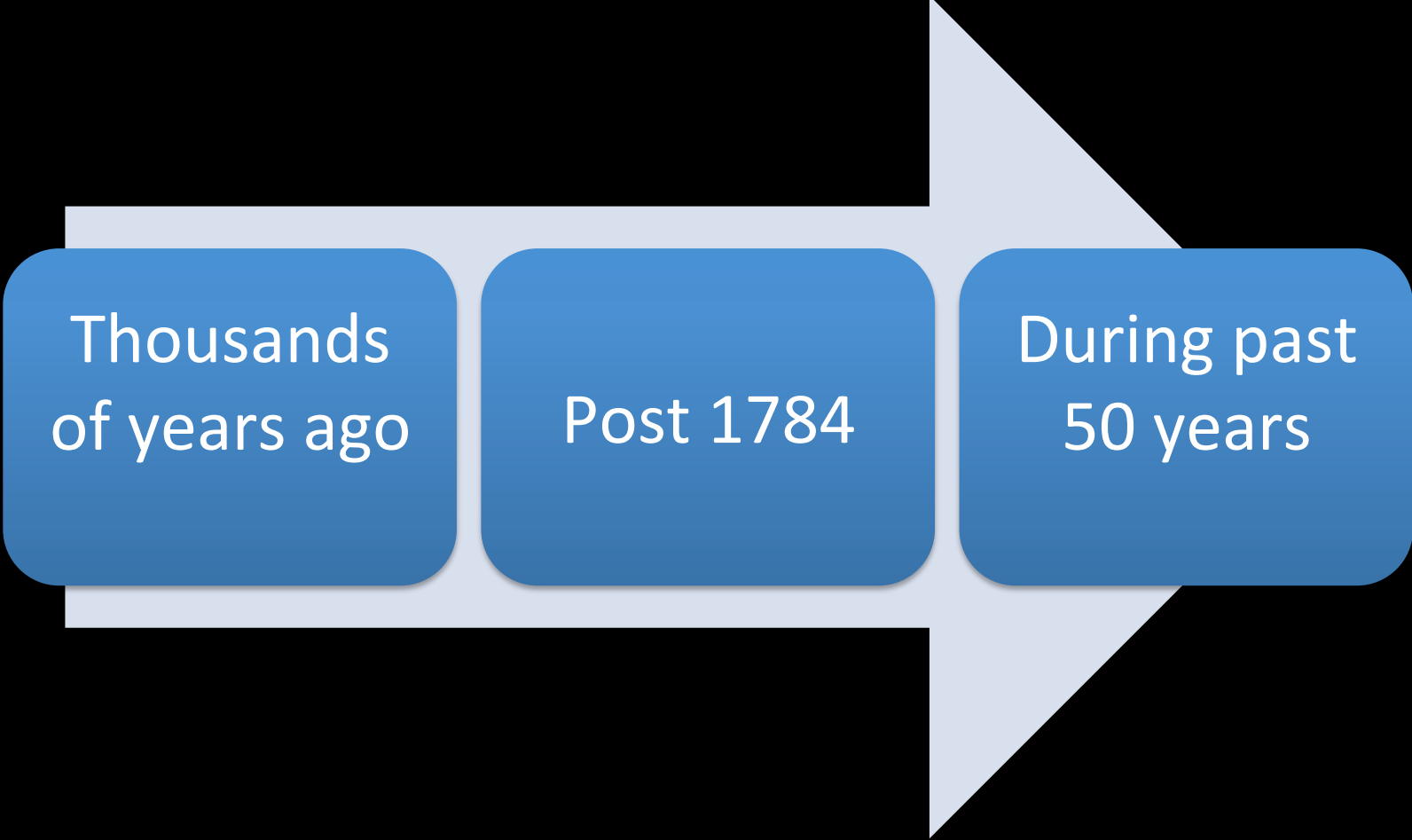
Sandra S. Lawn, Scott Davis and Dr. Susan  
Wood

OEMC – September 14, 2011

# Ontario's Eastern Zone



# Our story is about science and technology in Eastern Ontario



Thousands  
of years ago

Post 1784

During past  
50 years

# Naturalized Knowledge System



Knowledge is powerful but  
only when it is shared



Co-operation is the way to  
survive



Everything is connected to  
everything else

# Early North American settlers



Species	Parts	Use
<i>Picea mariana</i>	Twigs	"Spruce beer"
<i>Oak, Hemlock, Butternut, Birch</i>	Bark	Dyes, perfume
Sassafras	Leaves	Spring tonic
Pine	Oleoresin	<u>Naval Stores</u> - turpentine, pitch, tar, resin



I never knew these things came from trees...

Acids

Dyes

Gas

Animal Fodder

Explosives

Fabrics

Plastics

Protein

Glues

supplement

Vitamins

Food additives

Resins

Emulsifiers

Pharmaceuticals

Sugars

Liquid Fuels

Essential Oils

Toys

Diapers

Furniture

Dietary fibre

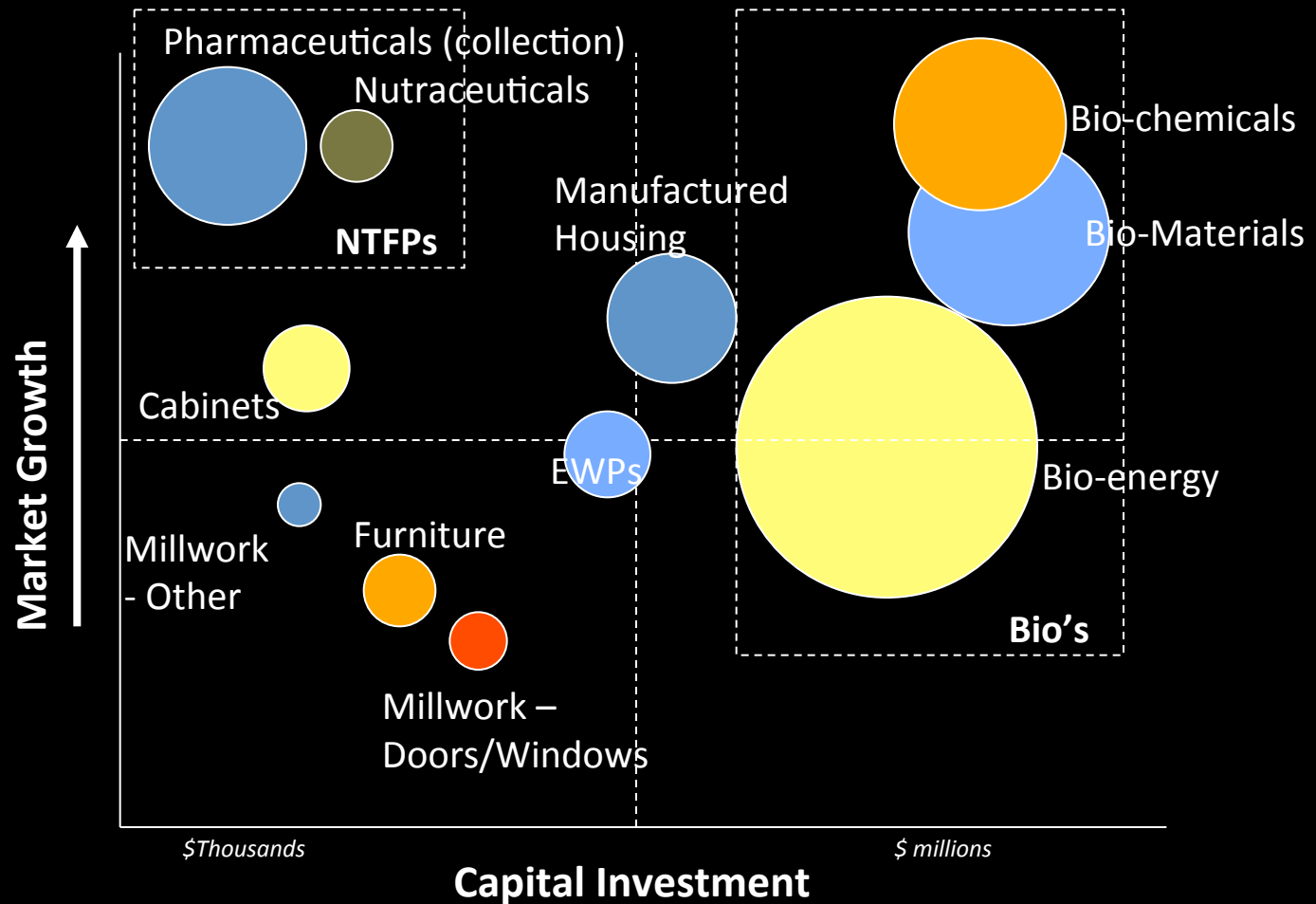
films

Filter tips

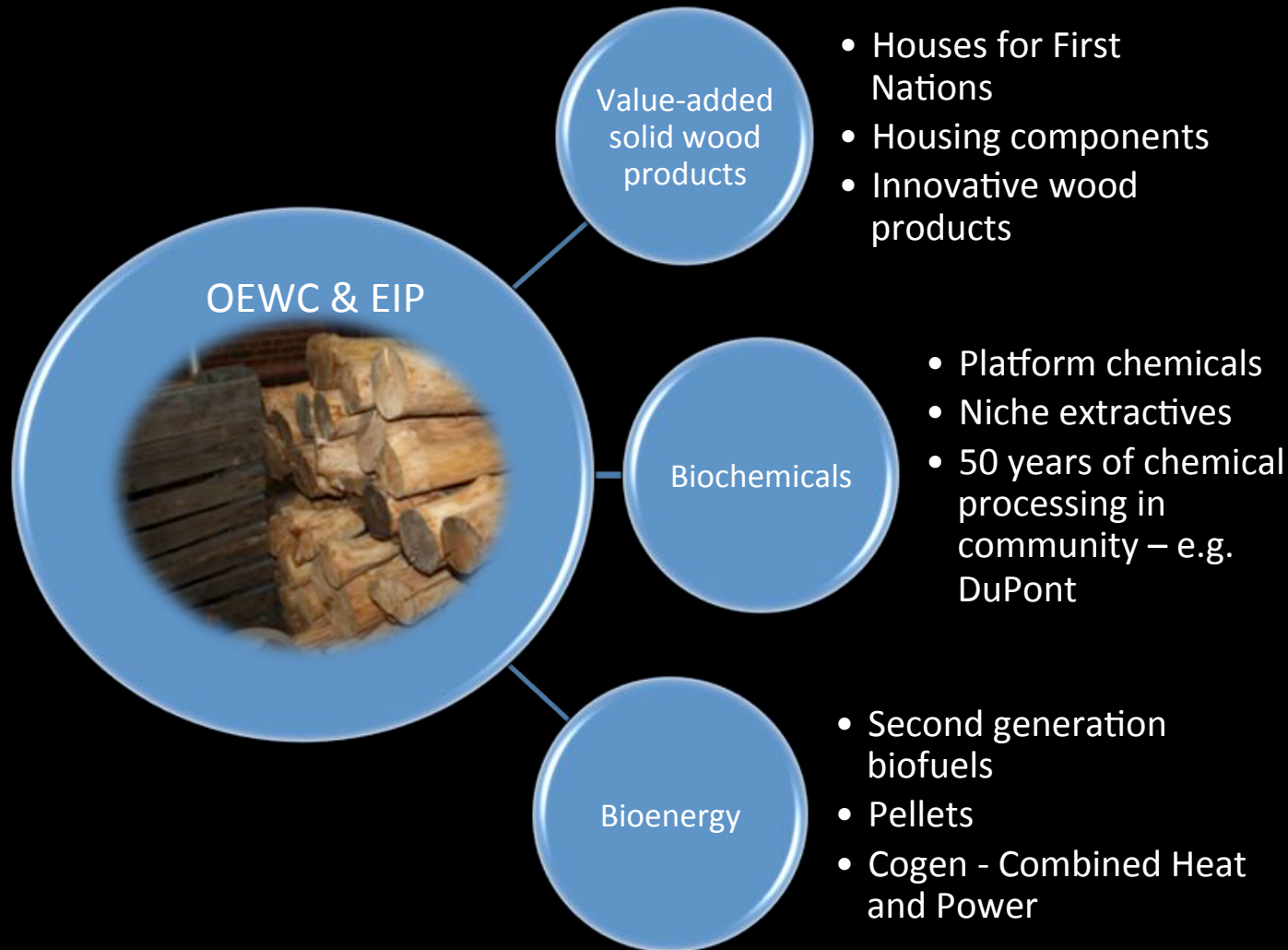
membranes

Dust control

# Best Opportunities



# Three streams of value-added products from sustainably managed forests in Great Lakes St. Lawrence forests plus agricultural biomass



# Traditions and skills with solid wood over the centuries



Richard David, master basket maker at  
Limerick Forest in Edwardsburgh/Cardinal

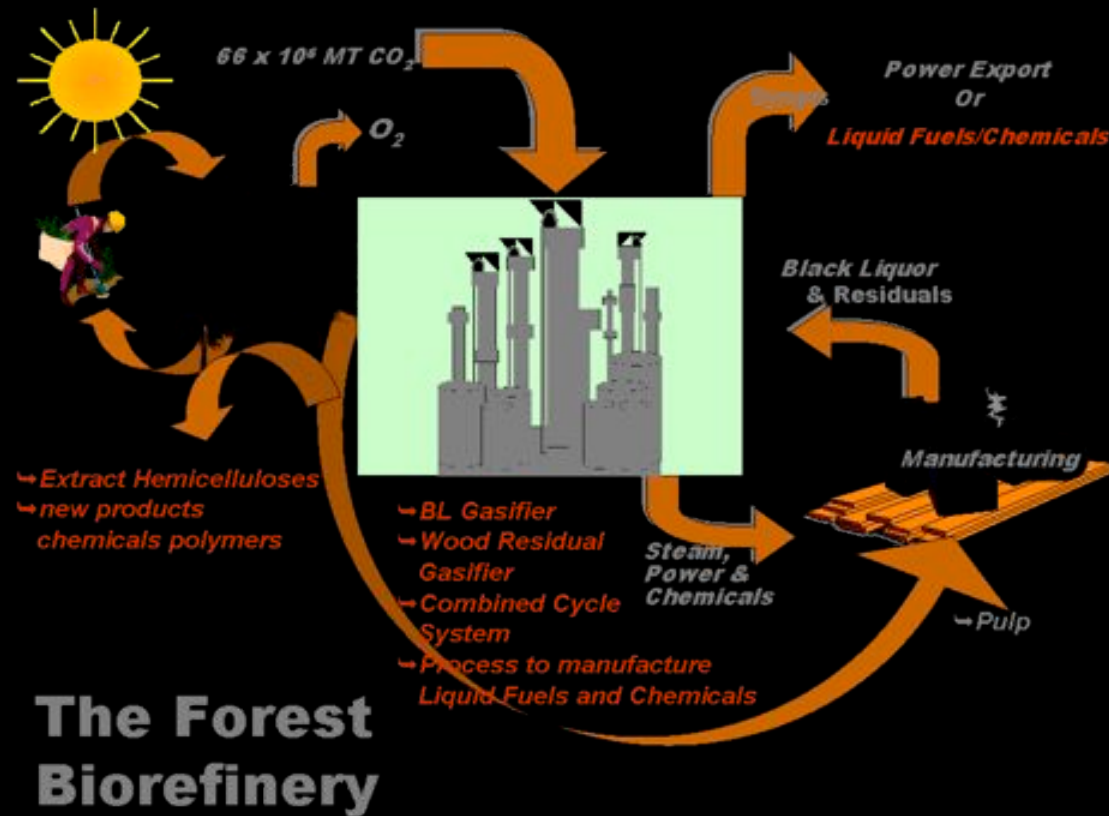
# Innovation with wood



# 2,200 black walnut trees; Dr. Neil Thomas



# Solid wood, energy and valuable extractives too



SUNY, Faculty of Environment and Forestry

# Eastern Ontario Model Forest

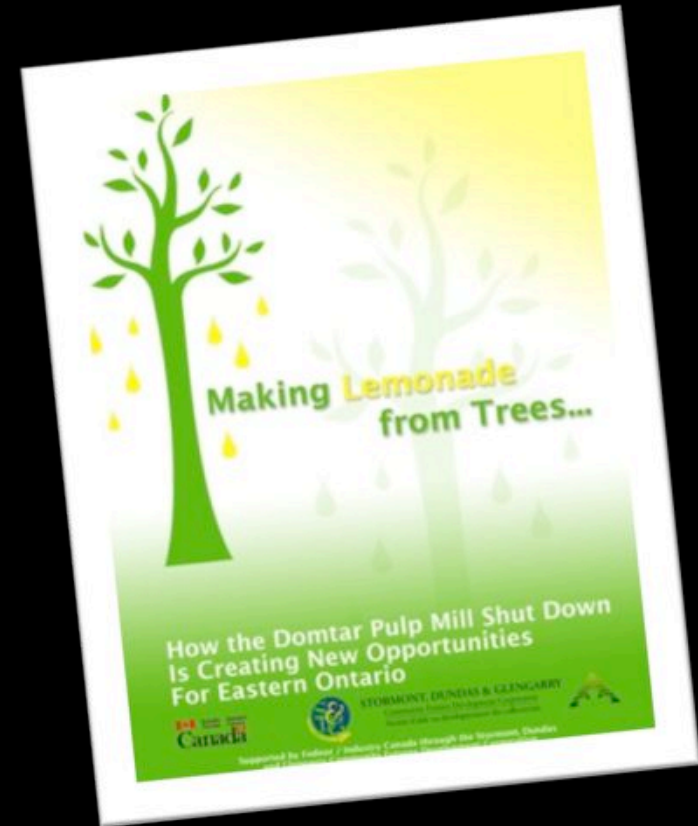
- Since 1992
- Over 600 well established partnerships
- Funding from Canadian Forest Service under Community Forests Program
- Knowledge base/research along the entire value chain
- Key link to sustainable forest resources, First Nations & regional innovation
- Forest Stewardship Council (FSC) certification: Scott Davis summary of FSC in Eastern Ontario
- [sdavis@eomf.on.ca](mailto:sdavis@eomf.on.ca)
- [www.eomf.on.ca](http://www.eomf.on.ca)





## Economic, energy and environmental opportunities in smart, low carbon, rural eastern Ontario

- Worldwide challenges of shifting markets, climate change, energy security
- Strong forestry *and* manufacturing culture
- Availability of feedstock -
  - Millions of metric tonnes of pulpwood material from Ottawa Valley, eastern Ontario, western Québec, Northern New York; currently virtually no market
- Ministry of Northern Development Mines and Forestry engaged



See at [www.eomf.on.ca](http://www.eomf.on.ca)



# Edwardsburgh/Cardinal: a founding partner



- [www.edwardsburghcardinal.ca](http://www.edwardsburghcardinal.ca)
- Beautiful historic rural community
- On the shores of the world's greatest supply of fresh water
- Route to the heartland of North America
- In the centre of the most significant hard wood forests in North America
- Community capacity: local strength
- 400 acres of industrial land
- Owners of Port of Prescott  
[www.portofprescott.com](http://www.portofprescott.com)



# WHARF TRAFFIC - 675,000 MT - IN/OUT



# GreenField Ethanol off to strong start

230 million litres of ethanol per year;  
now at over 120% of capacity; 52  
permanent jobs; 22 million bushels of  
corn mostly from regional farmers

By-products: heat, carbon dioxide and  
dry distillers grain

\$180 million dollar construction

Current research on cellulosic  
ethanol from corn cobs centred  
at Chatham

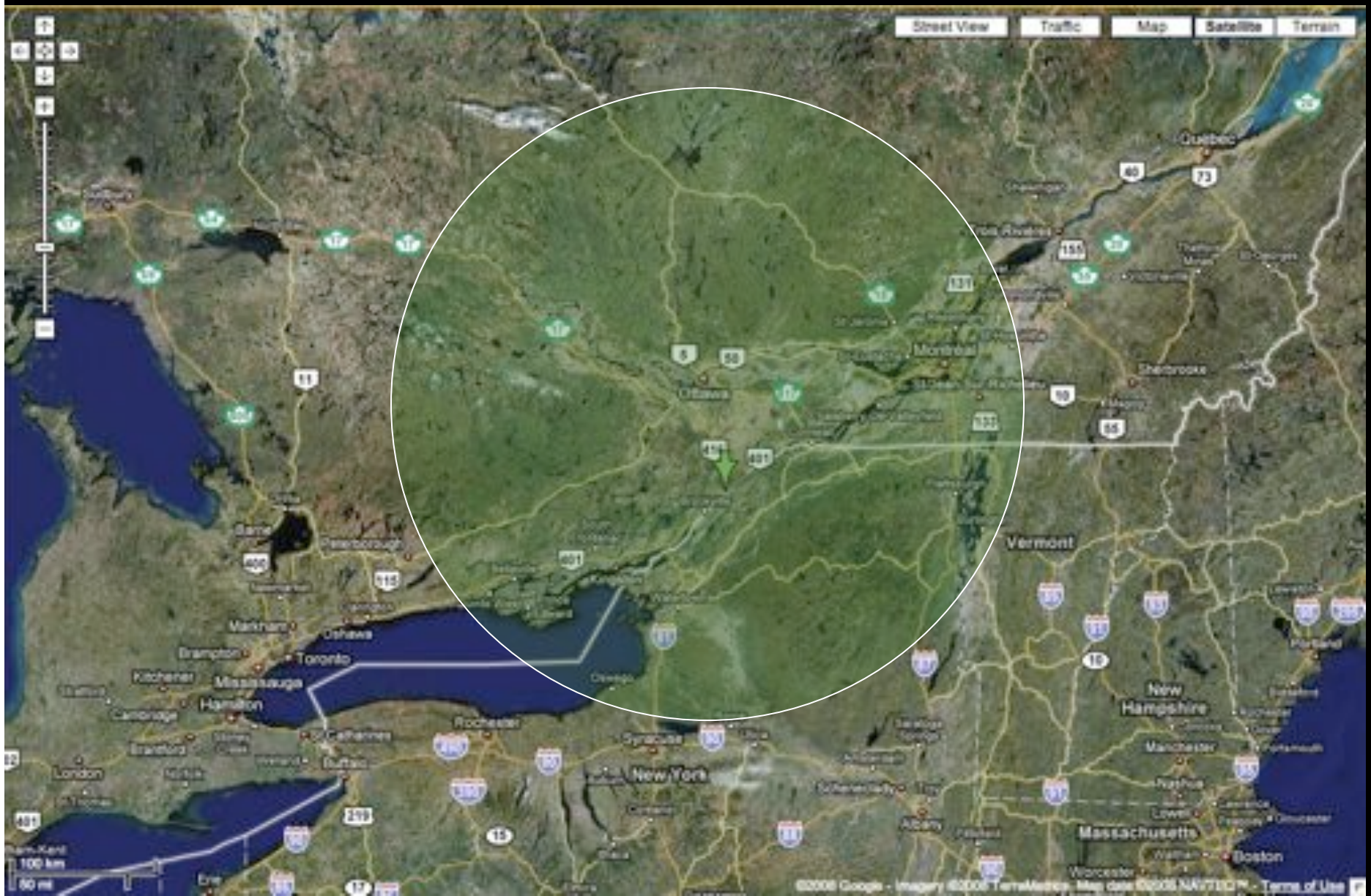
Darrel Veres, plant manager “actively  
seek to support the OEWC and anything  
that would create a synergistic benefit  
between Greenfield and the OEWC.”

- Verbal agreement to cooperate with  
greenhouse feasibility study
- Active and welcome partner



# Leaders: Clearydale farm near Spencerville





**North America's most significant hard wood forest: forest availability, 300km radius; Ontario, Québec and New York State; 70 species**



## Ontario East Wood Centre & ECO-INDUSTRIAL PARK

Incorporated in 2010  
Governance in place  
Partners in place  
Projects on the table  
One Substantial anchor  
Pre-engineering complete



# Geographic Advantage: transportation links support domestic and export markets with the rural landscape



# Incorporation of OEWC & EIP complete; objects are:

1. The development of a forest and biomass based and innovation-inspired cluster of industrial, business and demonstration projects in an ecologically sound environment
2. A platform for scientific collaboration, business development, demonstration, piloting, commercialization, exporting and marketing of a wide array of innovative value-added wood and biomass products, including but not limited to: solid wood building components, biochemicals and bioenergy
3. Assistance to the forest industry in creating uses for underutilized, lower value wood in Eastern Ontario and the region and
4. Participation in the restructuring of the forest industry of the Great Lakes/St. Lawrence forest for the benefit of rural communities and in partnership with a variety of other organizations, academic institutions, individuals and agencies with compatible goals.



# Board of Directors, OEWC

- Alastair Baird, Manager of Renfrew County Economic Development Department
- Brian Barkley, RPF, president of Canadian Model Forest Network, Interim chair of the board
- Ray Bonenberg; retired MNR Director of Southern Region
- Tony Bull (founding director), retired Parks Canada director, VP EOMF
- Dr. Michel Caron, La Cité collégiale
- Larry Dishaw (founding director) former mayor
- Deputy Mayor John Hunter, , Township of Edwardsburgh/Cardinal
- Geri Kamenz; Chair of Ontario Farm Products Marketing Commission, area farmer
- Sandra S. Lawn BSc, MPA, Project Leader, (founding director)
- Dave Lemkay, Executive Director, Renfrew Industrial Commission
- Henry Lickers, Mohawk Council of Akwesasne
- Jason Linkewich, B. Com, FCMA; Vice President – Fibre Supply Strategy, Tembec
- Dr. Steven Liss, Vice Principal (Research) Queen's University
- Dennis Senik, P. Eng., MBA
- Dr. Sandy Smith, Dean of Faculty of Forestry at University of Toronto
- François Tanguay of Coalition Bois in Québec
- Dr. Ed White, Professor Emeritus, SUNY ESF
- Michael Wildman, CAO of Edwardsburgh/Cardinal

# Special Advisors

- Patrick Huot, P.Eng., Industry Canada until January 2011
- Ian Manson, Economist, MNDMF



- Dr. Geoff Whitfield; retired chief scientist DuPont Canada
- Dr. Peter Hall, former NRCan
- David Mody P. Eng., Queen's
- Tom Richardson, forest industry
- Jim McCready, forester
- Dr. Sally Krigstin (U of T)
- Doug Cleary, agriculture
- Mark Angelini, Ontario Wood Export expert
- Dr. Warren Mabee, Queen's
- Jamie Stephens, UBC/Queen's
- Dr. Susan Wood, Director of Research, Queen's

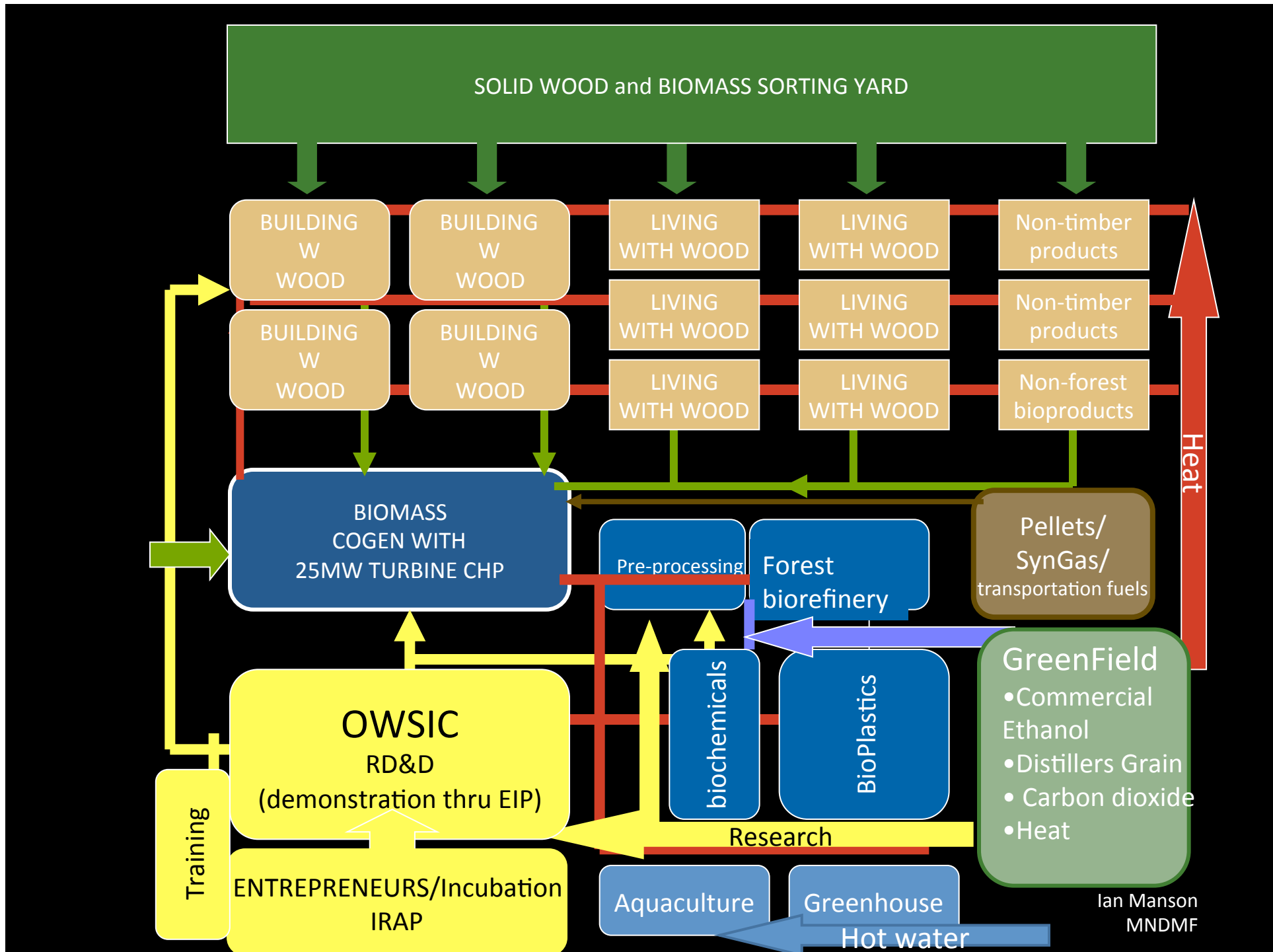


Directors of the OEWC Board, photographed on December 10<sup>th</sup> 2010 Back row: L to R: Dennis Senik, Ray Bonenberg, Dave Lemkay, Henry Lickers, Geri Kamenz, Brian Barkley (Chair) Front Row: L to R: Tony Bull, Larry Dishaw, Sandra Lawn (Project Leader) Mayor Bill Sloan  
Absent: Alistair Baird, Dr. Michel Caron, Jason Linkewich, Dr. Steve Liss, Dr. Sandy Smith, François Tanguay, Dr. Ed White, Michael Wildman



# Key public and academic relationships: active collaboration

- Algonquin College, Ottawa and Pembroke, Ontario: MOU in place; Department of Applied Research and Innovation Director
- Eastern Ontario Model Forest
- École Polytechnique: Dr. Paul Stuart
- Industry Canada, Natural Resources Canada, Foreign Affairs and International Trade, Agriculture Canada's Rural Secretariat, NSERC
- Guelph University, Kemptville and Alfred Campuses; Dr. Claude Naude engaged
- IRAP: active and involved: Mike Barré
- La Cité collégiale, Ottawa – MOU in place: Dr. Michel Caron – active participation re solid wood
- Loyalist College: MOU in place
- Ottawa Centre for Research and Innovation (OCRI): Clean Tech Division – there almost from the beginning
- Ministries of Natural Resources, Northern Development, Mines and Forestry, Agriculture and Rural Affairs, Economic Development and Trade
- \*\*Queen's University - Faculty of Engineering and Applied Science: Chemical Engineering, School of Business (Monieson Centre), Office of Director of Research, Law, Geography and Policy Studies
- St. Lawrence College- MOU in place
- State University of New York School of Environmental Science and Forestry
- Steering Committee, Technical Advisory Group and Board of Directors now in place...
- Township of Edwardsburgh/Cardinal and United Counties of Leeds-Grenville, Economic Development Department
- University of Toronto, Faculty of Forestry – with us from the start



SOLID WOOD and BIOMASS SORTING YARD

BUILDING W WOOD

BUILDING W WOOD

LIVING WITH WOOD

LIVING WITH WOOD

Non-timber products

BUILDING W WOOD

BUILDING W WOOD

LIVING WITH WOOD

LIVING WITH WOOD

Non-timber products

LIVING WITH WOOD

LIVING WITH WOOD

Non-forest bioproducts

BIOMASS COGEN WITH 25MW TURBINE CHP

Pre-processing

Forest biorefinery

Pellets/SynGas/transportation fuels

Owsic

RD&D (demonstration thru EIP)

biochemicals

BioPlastics

GreenField

- Commercial Ethanol
- Distillers Grain
- Carbon dioxide
- Heat

Training

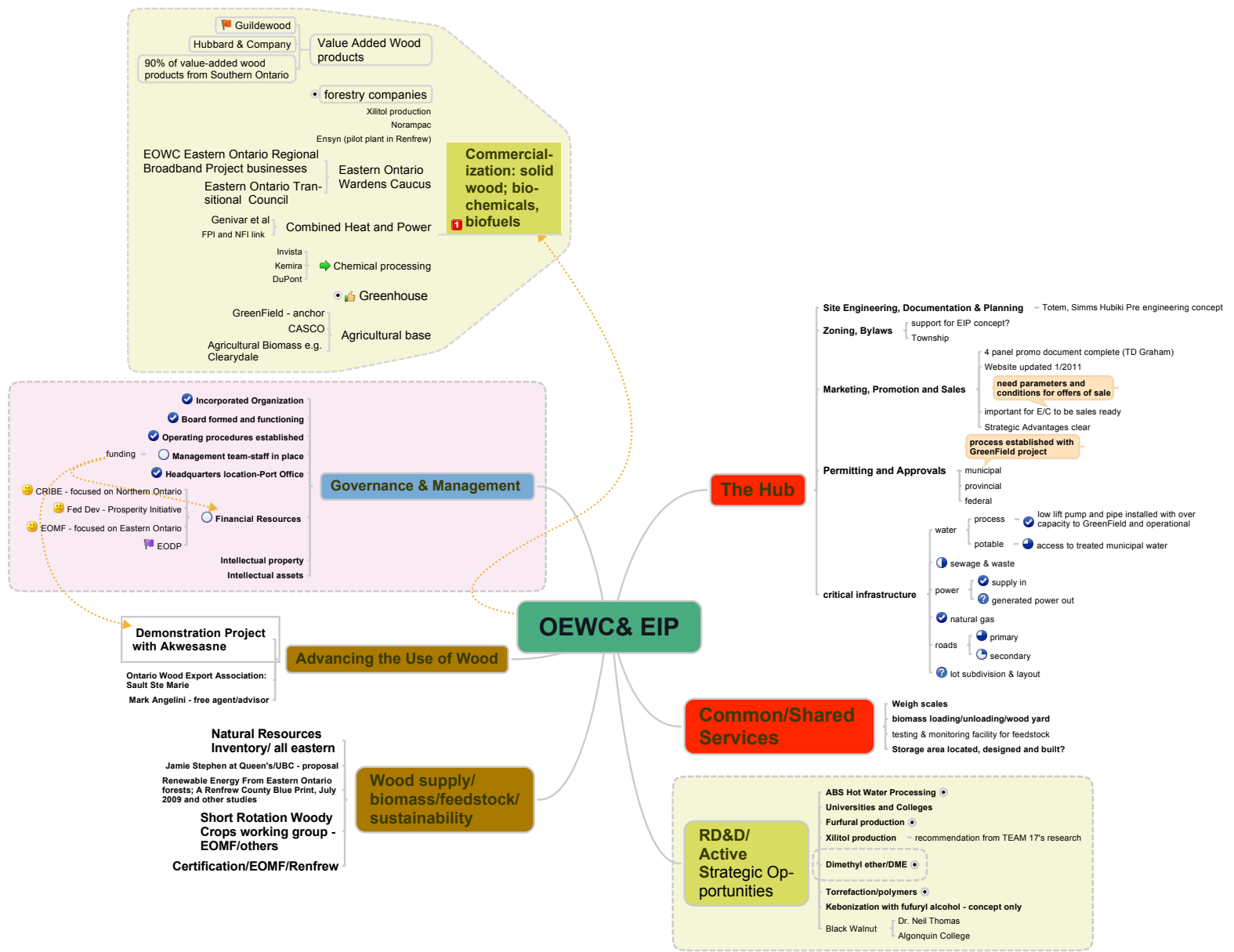
ENTREPRENEURS/Incubation IRAP

Research

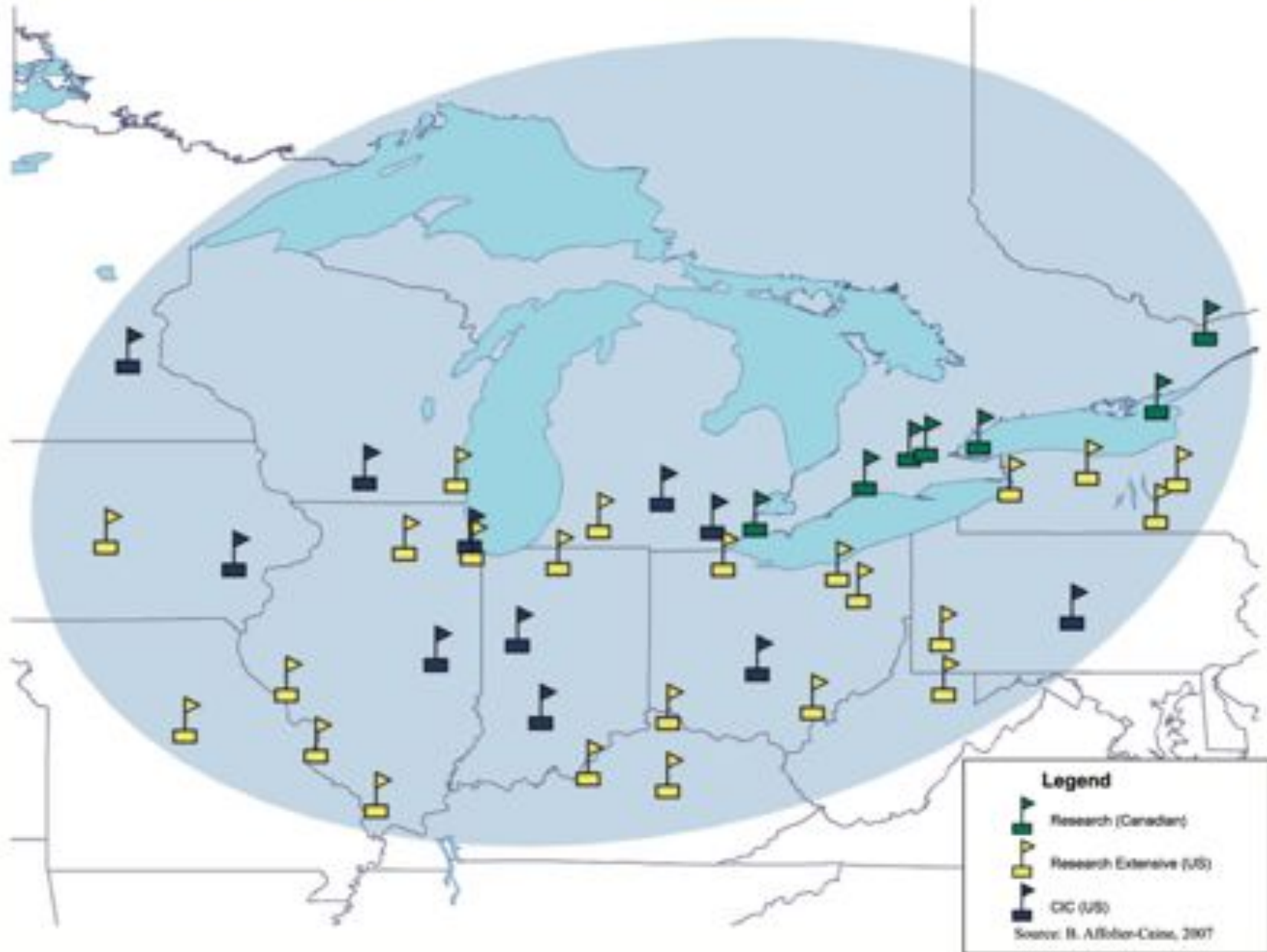
Aquaculture

Greenhouse Hot water

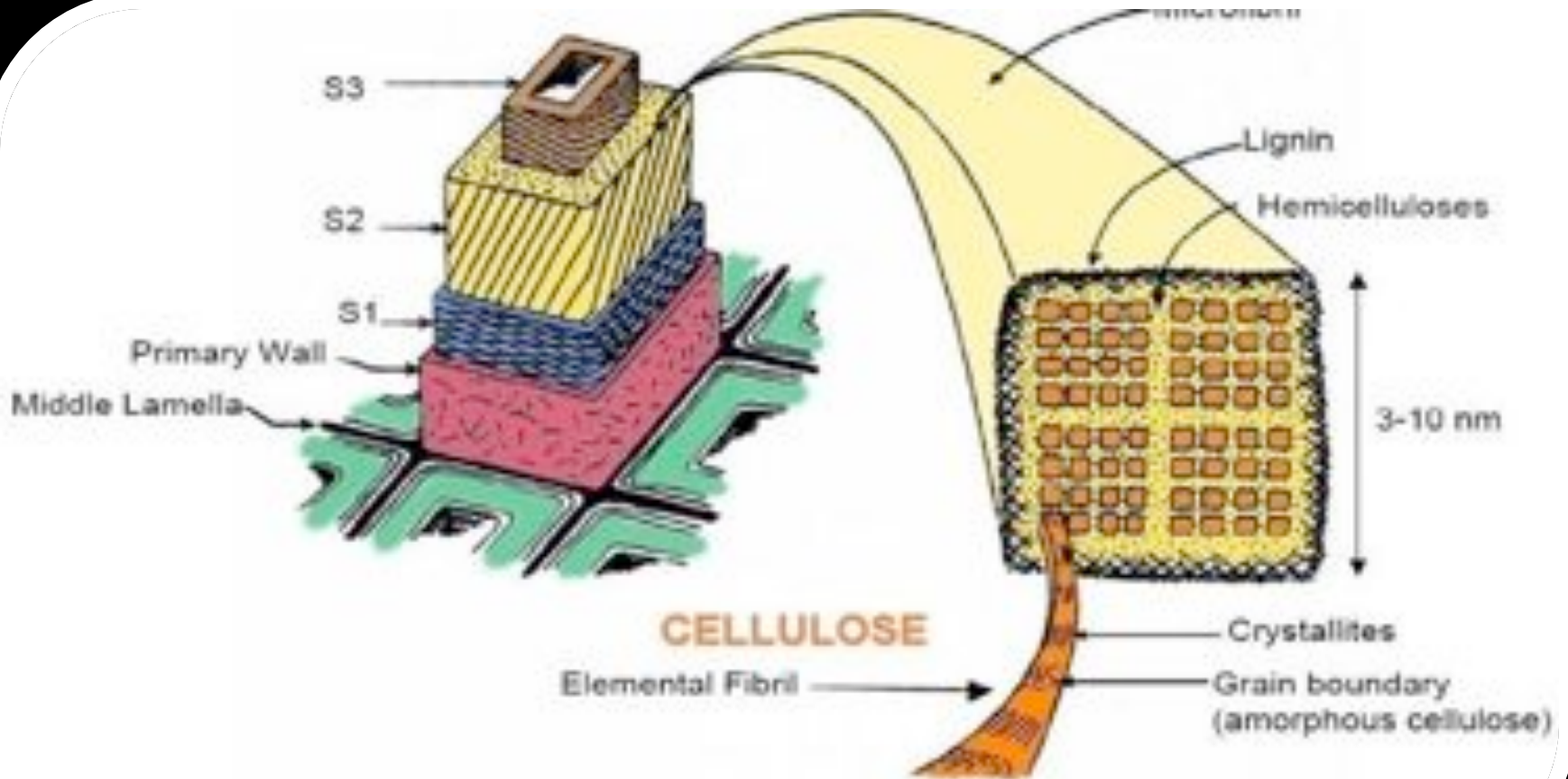
Ian Manson MNDMF



## Concentration of research extensive universities in the Great Lakes Economic Region

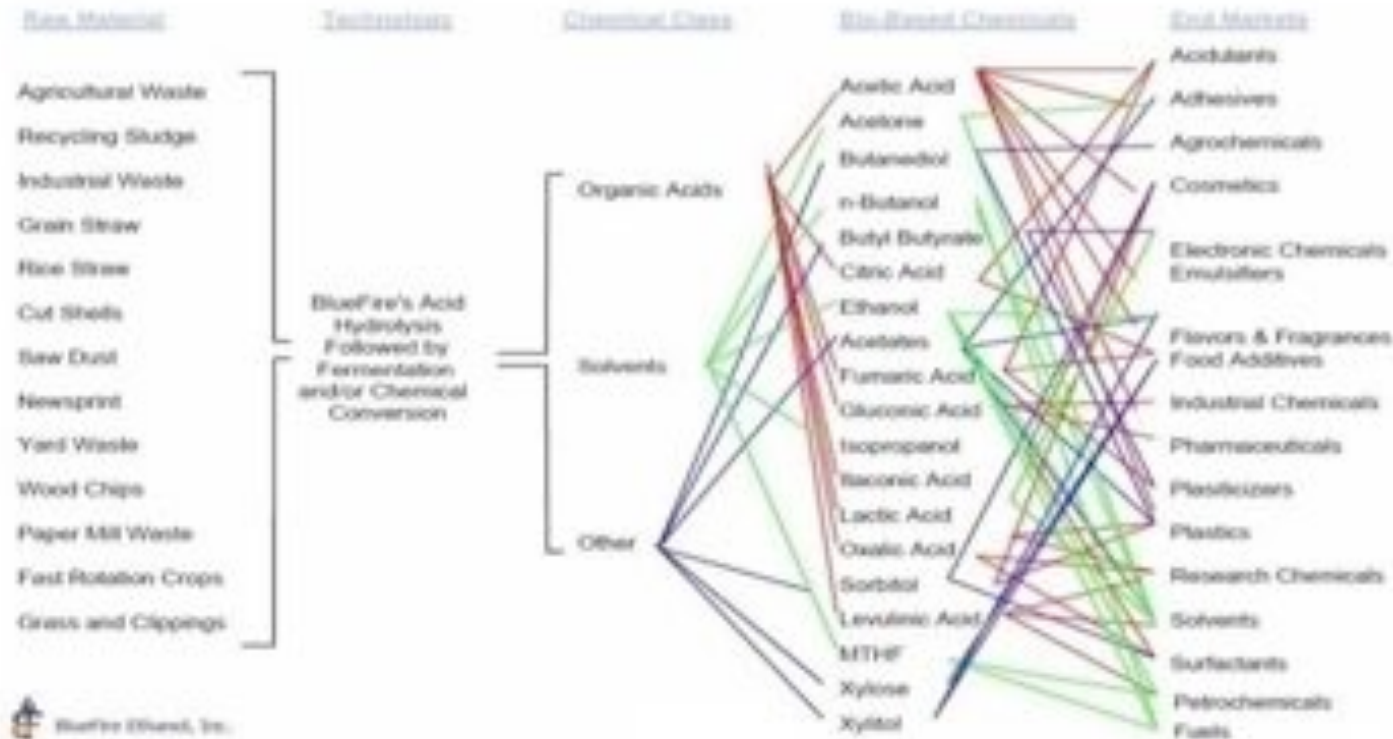


Bioproducts from Wood – Wood Chemistry presentation  
prepared for us by  
Dr. Sally Krigstin, U of T



# Another matrix of bio-based chemicals

## Technologies Already Exist Which Can Provide Competitive Entry into Bio-based Chemicals and Target Market Segments

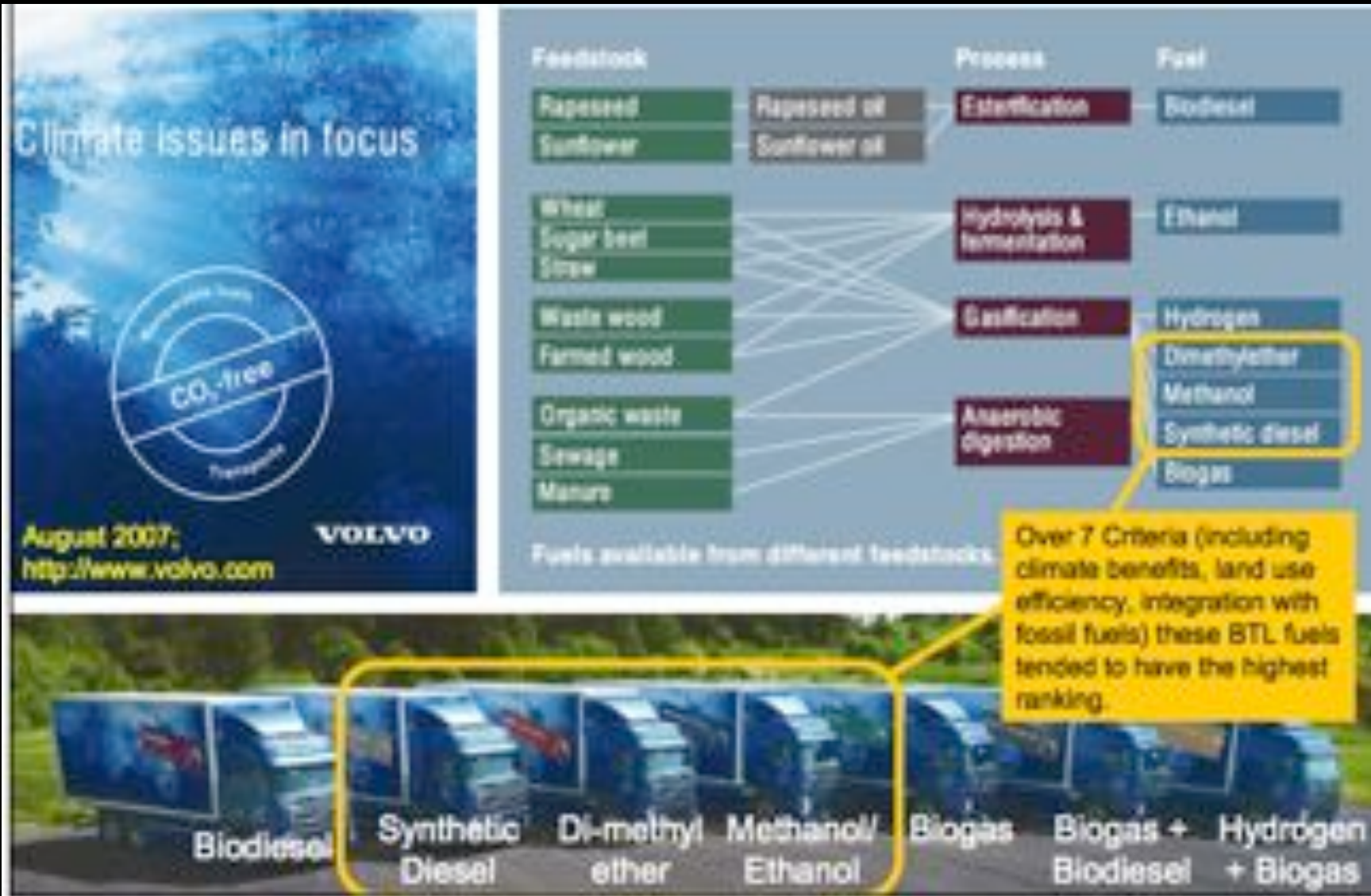


Source: BlueFire Ethanol Inc.

**Making bio-chemicals can be complex from both a technological and market perspective – partnerships are required to be successful.**



Dimethyl Ether production (U of Calgary slide); company working with Queen's/OEWC



## Great Lakes Region is home to business sectors with critical mass and global reach



\*Clusters size is represented by relative size of circles.

Source: Cluster analysis by James Milway, Executive Director, Institute for Competitiveness and Prosperity utilizing data from StatCan, U.S. Census Bureau, U.S. Bureau of Economic Analysis, U.S. Department of Labor Statistics

Visit to the port site by SUNY Environmental Science and Forestry's  
Dr. Tom Amidon and Dr. Ed White, March 18, 2010; Tom now working with New  
Forest Industries, collaborating with OEWC from Quebec

Mayor Larry Dishaw, Dr. Ed White of State University of New York, SUNY, Tony Bull EOMF, Sandra Lawn Project Leader,  
Councillor Frank Noccey, and Dr. Tom Amidon, SUNY. Tom is known around the world for his excellent work



# Queen's University 2010/2011

- Project #1 2010/11 The students evaluated the technical, safety, environmental and business feasibility of the demonstration plant based on hot water extraction process and developing a document that will be used to draw capital investors to the project. The students gain insight into the complicated world of corporate strategic planning and capitalization within the context of leading edge technologies in an emerging bioeconomy .
- Project #2 2010/11 The students were working in parallel with Project #1 developing the in-depth information on processing technology, supportive data on reverse osmosis/ membrane technology, equipment needed, strengths of this technology compared to other competing technologies, products produced esp. xylitol, uses of these products, emerging new products and new approaches to specific parts of the process etc.
- Chemical Engineering 470 course: the students evaluated the technical, safety, environmental impact and business feasibility of an idea that utilizes furfural derived from woody biomass. The purpose of the plant is to make the fuel additive 4-Methyltetrahydrofuran and furfural. The feasibility study should produce a safe and efficient design for a facility providing 5% of the volume for a 100,000 barrel per day bio-oil refinery. It is also an interesting feature of the project that the design is to be flexible in the products produced. Currently working on dimethyl ether project – presentation September 14, 2011
- Chemical Engineering 360 course: Engineering Communications linked to the CHEE 470 above
- This years CHEE 470 – DME etc.

# Colleges – valuable collaboration

La Cité collégiale, Ottawa – signed memorandum of understanding on February 10, 2010 in areas such as construction (aboriginal housing), architecture, forest technology, biotechnology, exterior design and environment as programs that can be involved. They also have an international project pertaining to workers mobility including students with institutions from France and Finland. We were pleased to welcome Jukka Asp from Finland on October 4, 2010

St. Lawrence College, Brockville campus - signed MOU; especially supportive re training and stationary engineering, applied technology, business planning and other related programs

Algonquin College, Ottawa and Pembroke, Ontario – Applied Research and Innovation Director – signed MOU seeking relationship in variety of areas including involvement of Forestry Technician students in Pembroke and applied technology with respect to forest related initiatives; September 18, 2010 visit to Black Walnut plantation – collaborative project

Loyalist College at Belleville – MOU now in place; special interest from Bancroft campus – strong lumbering area; FPI/EOMF seminar in Bancroft February 15, 2011 – small turnout but good interest

Confederation College, Thunder Bay, Ontario – Innovation Development Program were interested in a formal relationship; especially with respect to First Nations Housing, cedar project and twinning of northern community with Edwardsburgh/Cardinal. CRIBE located here -little progress

# Dr. Geoff Whitfield sharing his great knowledge



# Queen's TEAM 17 presents Xylitol Project on April 12, 2011; Dr. Susan Wood key support



# Queen's TEAM 12 presents Furfural Project on April 9, 2011



A visit on April 4, 2011 by biofuel proponent from Calgary CHEE  
470 course underway





For community  
development

IN RESPONSE TO  
Climate change,  
energy security,  
environmental  
sustainability

Everything is connected  
Co-operation,  
Knowledge sharing ,  
Responsibility



**Ontario East Wood Centre**  
& ECO-INDUSTRIAL PARK

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