Identifying successful business models, strategies and policies for promoting the Canadian Bioeconomy

David Sparling & Erin Cheney
Richard Ivey School of Business
University of Western Ontario

John Cranfield
FARE
University of Guelph
Two Major Activities


- Case studies: select Ontario firms involved in biomaterials/chemicals studied to understand the firms’ business models, value chains and strategies
NOT ENOUGH GREEN IN CANADA’S BIOPRODUCT INDUSTRY

David Sparling, Erin Cheney and John Cranfield
Key Findings – 2009 Bioproduct Production & Development Survey

1. Contracting industry
   - Firm numbers fell from 239 to 208
   - Revenue down 57% to $1.33-billion

2. Declining revenue, exports, employment
   - Revenue from exports down 71%
   - Employed only 38% of the workforce reported in 2003

3. Dominated by one product - ethanol
   - Ethanol accounted for 68% of total industry revenue
   - 20 ethanol firms ‘in production’

Key Findings – Better for Ontario

1. Growing industry
   - 68 firms in Ontario; up from 52 in 2006
   - Gross bioproduct revenue: $832-million (2009)

2. Declining revenue, exports, employment
   - Ontario led exports with $355-million; 81% of national total
   - employed 979 (2009)

3. Dominated by one product - ethanol
   - Ethanol accounted for 68% of Ontario industry revenue
   - 10 out of 20 ethanol firms ‘in production’ in Ontario

Quick facts – Canada (2009)
• 208 firms
• 81% are small firms
• Bioproduct revenue: $1.3-billion
• 9% of total firm revenue
• $64.6-million spent on bioproduct R&D
• 10.5-million MT of agri-biomass
• 16.4-million MT of forestry
• Cost of biomass: $1.8-billion
• Leading bioproducts (by # of firms): Bioenergy, biodiesel, other organic chemicals
• Top bioproduct by revenue: Ethanol

Highlights - Canada
• Agricultural and forestry biomass most widely used inputs
• Small firms are focused on bioproducts - large firms aren’t
• Almost $1-billion in cost savings from producing bioproducts for internal use – mainly in BC
• The industry remained challenged by access to capital, regulation and most recently the cost of acquiring biomass
Collaborative arrangements with other organizations

98 firms engaged in collaborations

- 76 small firms
  - 354 collaborations (4.7 per firm)

- 7 medium firms
  - 21 collaborations (3 per firm)

- 15 large firms
  - 84 collaborations (5.6 per firm)

NOTE: pure contracting out work, where money is paid for service, is not regarded as collaborative arrangement

## Partner-type involved in collaboration

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<th>Medium firms</th>
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<th>Total</th>
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*Own firm’s operations outside of Canada were excluded

Source: Statistics Canada Bioproduction Development Survey 2003, 2006 and 2009
Reasons for collaborations

- Access outside scientific expertise
- Conduct research and development
- Access capital
- Access partners' intellectual property
- Access marketing/distribution channels
- Access regulatory affairs expertise
- Access production/manufacturing...
- Access to biomass

Source: Statistics Canada Bioproduct Development Survey 2009
148 firms attempted to raise capital for bioproduct activities

133 small firms
- R&D purposes
- Proof of concept/pilot project
- New plant/facility

6 medium firms
- New plant/facility
- R&D purposes
- Expand current facility

10 large firms

130 firms were successful in raising capital (87.8% success rate)

Source: Statistics Canada Bioproduct Development Survey 2009
REGIONAL OVERVIEW

National experience not necessarily the situation in all regions
Large companies - limited BP focus, saving money by producing and using forest-based bioproducts.

PRAIRIES (52)
BP focused firms with slipping R&D, working with agri-biomass and residues for biofuel, material development.

ONTARIO (68)
Largest number of firms, employees, bioproduct revenue and exports but firms battle increasing biomass costs. Focus is bio-based chemicals and biofuel.

QUEBEC (45)
Region has lost 38% of firms numbers 2003; reflected in employment, spending, exports.

ATLANTIC (16)
Fewest firms working in BP with half using forestry biomass.

BRITISH COLUMBIA (26)
(X) Number of firms
Findings - Ontario

Some good news

- Ontario only region to show increase in number of firms
- Firms reported significant increases in bioproduct gross revenue and exports (2006-09)
- Ontario’s total bioproduct gross revenue was $569-million
- Used primarily agri-biomass
- Number of firms with patents and number of patents are up
- Ontario firms invested almost half of national bioproduct R&D total
• Ontario firms are not making money
• Gross bioproduct revenue has not recovered to high in 2003
• Cost of biomass increased 15% (2008-2009)
• Ethanol firms accounted for 68% of provincial bioproduct gross revenue
• 34% of agri-biomass used by Ontario firms sourced from U.S.
• Firms able to raise only 58% of financial targets
BIOMASS OVERVIEW

Firm behaviour based on primary biomass feedstock
Findings - Canada

- 40% of forestry firms produce bioproducts for internal use vs. 8% of agri-firms
- Agri-firms cite ‘cost of biomass’ as key barrier to production vs. ‘lack of capital’ for forestry firms
- Similar % of firms with patents in each biomass group but 72% of bioproduct patents held by Other biomass firms
- Agri-biomass firms raised the most capital; forestry brought in 2/3 the amount of agri-firms and other biomass firms roughly 60%
- All biomass types had similar success rate but Other biomass firms hit only 47% of targeted amount vs. 66% and 67% for agri and forestry firms

46  forestry biomass firms
87  agri-biomass firms
75  other biomass firms
CASE STUDIES

Survey results reveal only part of the story
Key Findings

Chemical replacement
- OEM
- Tier 2 supplier
- PolyOne
- Segetis
  - Levulinic acid supplier
    - Hemi-cellulose (C5); sugar/starch (C6); vegetable oil

New properties, better price
- National retailers
- Molders
- Evolution BioPolymers Inc
- Compounder
- Switchgrass (fibre)

Security of supply
- Manufacturers: Tires, chewing gum, other
- Lanxess (Bio-butyl rubber)
  - 50% of production at Sarnia, Ontario
- Gevo (iso-butanol)
  - Corn; wheat; lignocellulose (NG)

Optimal function, improved price
- Market alliances: Sinoven (PBS); Mitsui (Derivatives)
  - BioAmber (Bio-succinic acid)
- Corn; wheat; lignocellulose (NG)

Legend:
- Missing link
- New economy bio-based
- Old economy bio-shift
‘Not enough green in Canada’s bioproduct industry’ paper available at www.ivey.uwo.ca/agri-food

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