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Integrating Bioenergy with Forest Sector Facilities

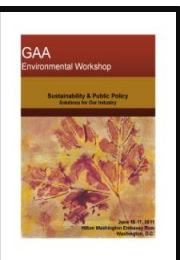
Catherine Cobden, VP Economics
GAA Conference
June 17, 2011

GAA Environmental Workshop
Washington, D.C. June 15-17, 2011

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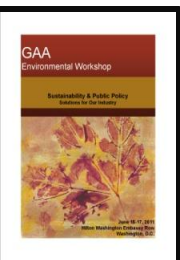


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Outline

- Context
- 4 Pillars of Industry Transformation
- Bioenergy Transformation Activity
- Biopathways Project – Summary



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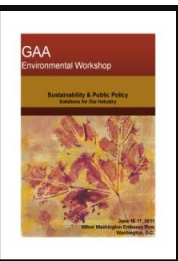
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Context: Canadian Forest Industry

- Emerging from economic downturn
- 100,000 job losses
 - Current employment 260,000 Canadians
 - Support for ~ 300 rural communities
- Structural decline in some markets
- Government policy playing an increasing role in our competitiveness position



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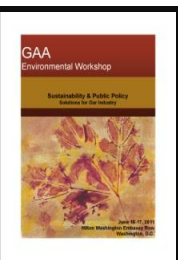
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Industry Transformation

- Four key areas of activity:
 1. Enhancing our productivity and competitiveness
 2. Diversifying our markets and products
 3. Capitalizing on our green credentials
 4. Innovating our business models



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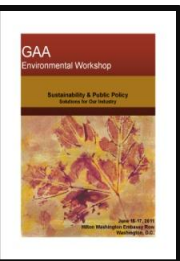


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Transformation Principle

Extract maximum value from every tree
harvested

- To be competitive; to protect and grow jobs; to protect forest ecology and to support rural communities



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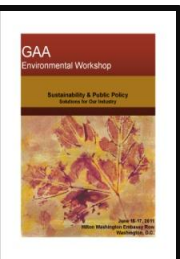
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Energy Highlights



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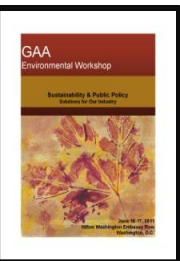
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Sector Highlights: Energy

- The largest industrial energy user in Canada
- Largest industrial cogeneration host
- Self-generate the equivalent of 3 nuclear reactors
- Enough green power to feed Ottawa-Gatineau
- Greenhouse gas and air emissions improvements



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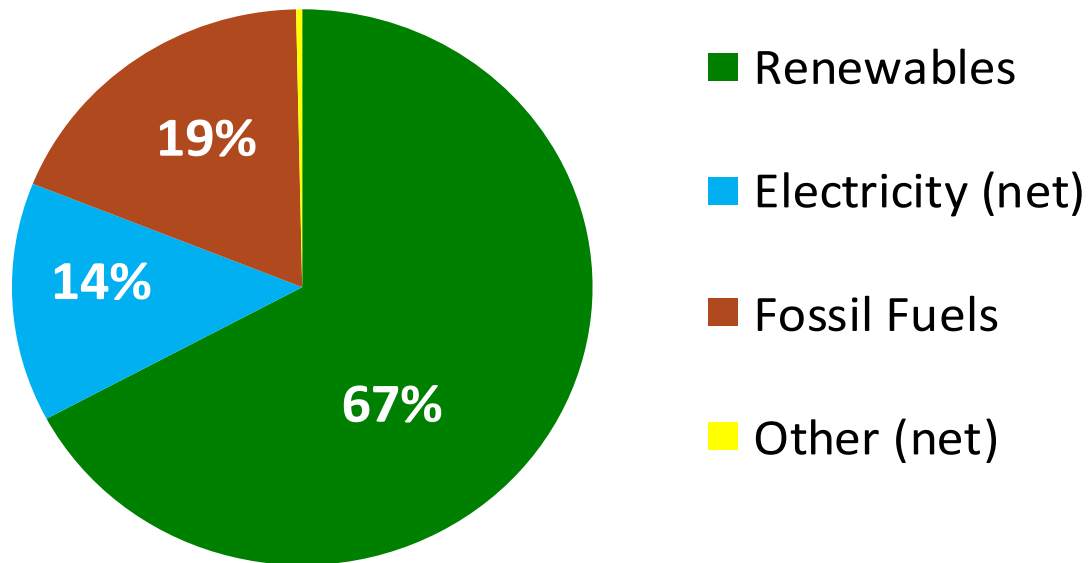
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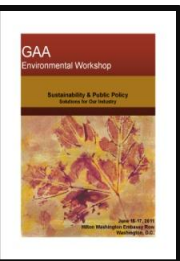
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Embracing Renewables

FPAC Pulp & Paper Energy Shares, 2009



Source: FPAC Energy Survey 1990-2009

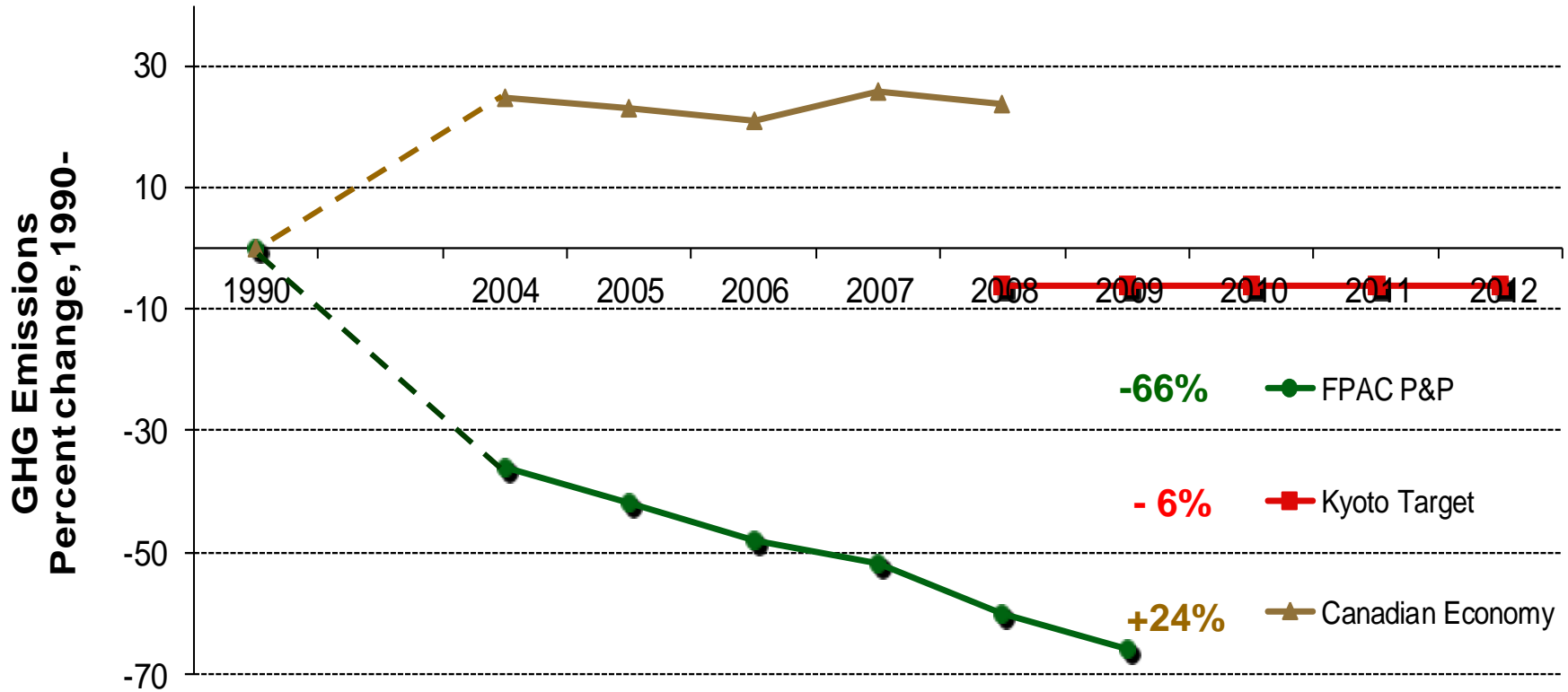


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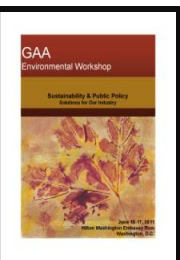
FPAC Pulp & Paper Mills Performance



Source: FPAC Energy Survey 1990-2009; Environment Canada. National Inventory Report: Greenhouse Gas Sources and Sinks in Canada, 1990-2008.

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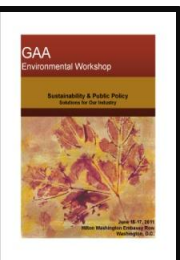


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Biopathways Summary



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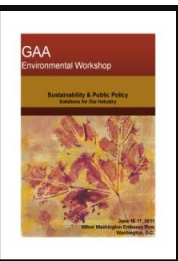
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Transformation Tool: Biopathways Project

- Major collaboration over 2 years
- Analyzed 36 traditional/emerging technologies under different scenarios
- Assessed economic, environmental and job impacts of these technologies
- Looked at impact of producing as stand alone or integrated with existing forest operations
- Looked at implications of location and scale of operations
- Established ongoing capacity to expand and grow as more technologies emerge



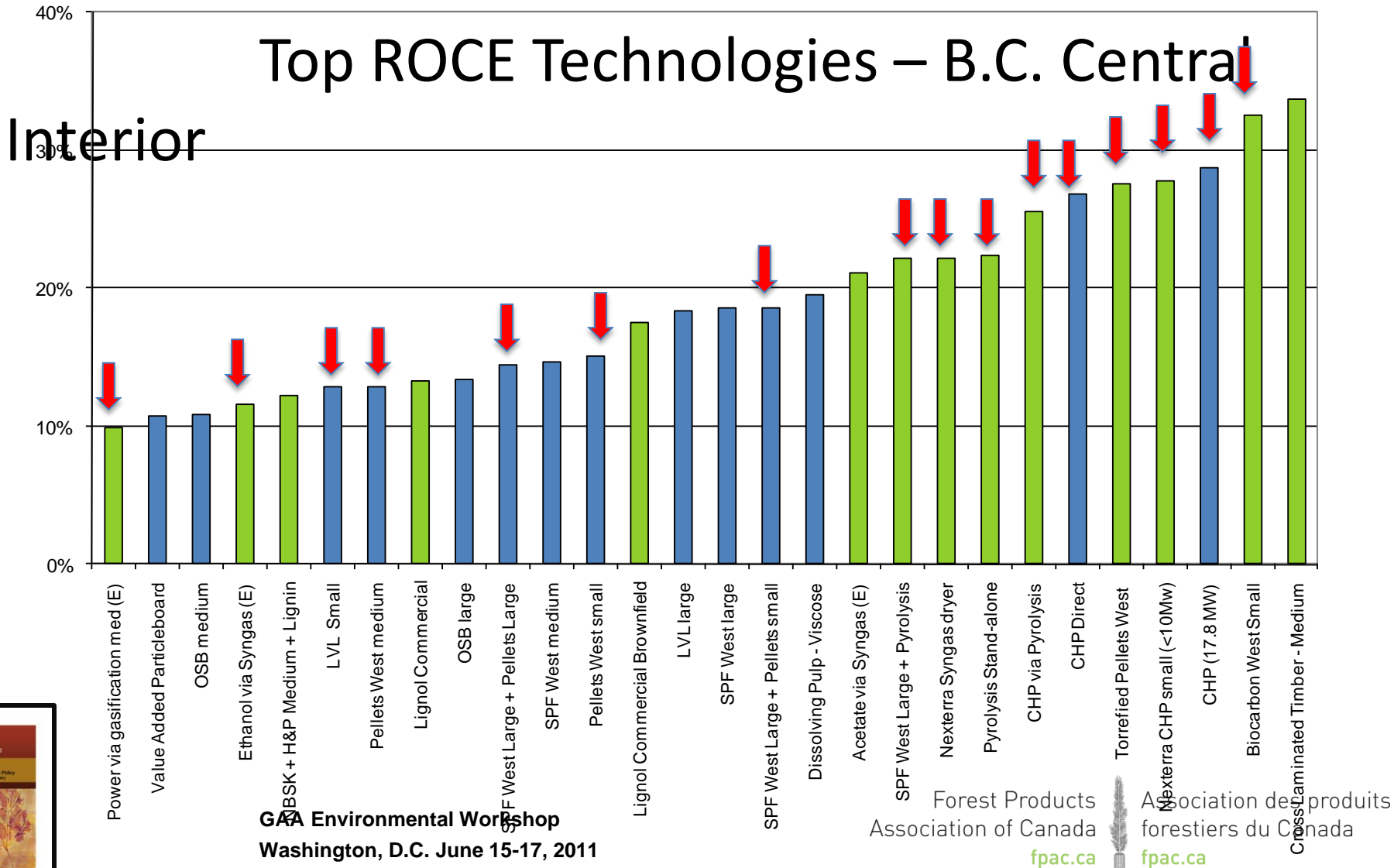
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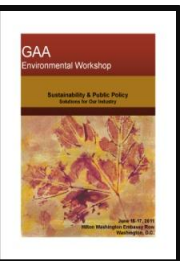
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Technology Results



Environmental Perspective

- Highest standards of sustainable forest management practices assumed in place
- Waste-based, does not require additional harvesting
- Carbon performance of interest to marketplace; criteria in existing and forthcoming regulations; and crucial question for many stakeholders
- Pathways analysed were neutral to negative carbon footprint (i.e. cradle-to-grave) at this level of analysis
- Differences exist across regions and pathways
- More analysis to be done with partners



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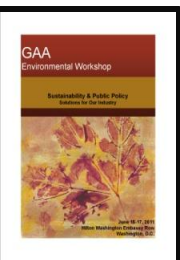
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MARKET ASSESSMENT AND VALIDATION



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Gross Market Opportunities

The 2015 bio-product market potential is 4 times the size of the current conventional market

GROSS MARKET OPPORTUNITIES

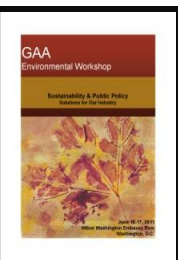
Products	Annual Growth Rate (%) 2009-2015 (approximate)	Global Market Potential 2015 (US\$ billion)
Green chemicals	5.3	62.3
Alcohols	5.3	62.0
Bio-plastic and plastic resins	23.7	3.6
Platform chemicals	12.6	4.0
Wood fibre composites	10.0	35.0
Glass fibre market	6.3*	8.4
Carbon fibre	9.5	18.6
Canadian forest products industry	neg. to 0-2	50.0

References:

Markets and Markets. 2009. Global Renewable Chemicals Market. The Freedonia Group. 2009. World Bioplastics. Industry Study 2548. Lucintel. 2009. Global Glass fibre Market 2010-2015: Supply, Demand and Opportunity Analysis. Acme Market Intelligence. 2010. World Carbon fibre Composite Market.

* CAGR for 2010-2015

Source: Natural Resources Canada (NRCAN) and Industry Canada (IC)



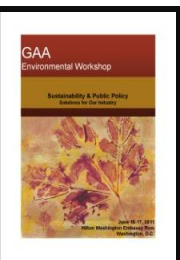
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Bioenergy Observations

- Integrated energy production in existing mills is a necessary step in forest sector transformation
- Bioenergy production is economically more viable in facilities where high-value by-products are also made
- The scale of bio-energy deployment depends on biomass availability and price
- The domestic market for bio-energy use is not well-developed
- Patchwork quilt of policies reduce ability to develop large-scale bio-energy demand and supply



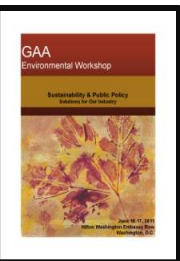
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Biopathways Conclusions

- The Canadian forest sector already produces a range of green low-carbon products
- Great opportunities exist to extract more value from every tree harvested
- Bioenergy and bioproducts will not replace the traditional forest industry, but will be supplement it and add value
- This integration will be good for jobs, economics and the environment
- Partnerships are a significant part of the new business model



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Bio-pathways Partnership Network



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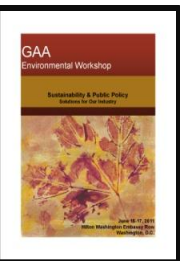
Organizations Engaged

- ABitibiBowater
- Alberta Innovates
- Alpac
- AV Group
- Bioauto Council
- Biovision Technologies
- Canfor
- Canadian Forest Service
- Canadian Renewable Fuels Association
- CIBC World Markets
- CRIBE
- DFAIT
- Daishowa Marubeni International
- Dow
- Dupont
- Ensyn Technologies Inc
- FPIInnovations
- Lignol
- Lockheed Martin
- Mascoma Canada
- Mercer International
- Met Tech Inc
- Newalta
- Sustainable Development Technology Canada
- Stepan Canada
- Sustainable Chemistry Alliance
- Tandem Expansion Fund
- Tembec
- Tolko
- Vertichem
- West Fraser
- Woodbridge Foam
- Woodland Biofuels Inc
- ZeaChem

150+ organizations on distribution list; growing daily

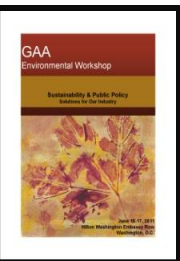
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In Summary

- The industry is not standing still, transformation is underway
- Canadian forest sector has potential to be a major force in the 21st century economy and emerging new markets
 - Forest sector is economic cornerstone to aspirations of green economy
- Biopathways points out one of the important paths
 - \$200B emerging market is dynamic and happening
 - Integration is key for economics, jobs, environment
 - Partnerships are critical
- We've found the path, lets work together to accelerate transformation



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