



The BIOCAP Canada Foundation

Fueling & Energizing Canada's Bioeconomy

March 31, 2007

FY 2006 – 07 Activities & Accomplishments

An Introduction to BIOCAP

The BIOCAP Canada Foundation provides an efficient and effective vehicle to focus Canada's research capabilities and to seize the opportunity to move towards a sustainable bioeconomy. BIOCAP has created a powerful model to engage diverse stakeholders in developing integrated solutions to provide a major renewable energy resource and healthier air, water and soil while enhancing the rural economy. BIOCAP is recognized nationally and internationally as a lead, arm's length organization facilitating Canada's transition to a sustainable bioeconomy.

BIOCAP's core strength is the integration of research capacity and synthesis of outcomes across disciplines and sectors that do not traditionally work together. The Foundation has a proven track record in stimulating innovation, integrating insights and technologies from diverse sources and transferring knowledge to inform policy and investment decisions in government and industry.

A Sustainable Bioeconomy

...an economic system in which the nation's biological resources (e.g. forests and farmlands) provide:

- renewable energy, chemicals, materials;
- environmental values (healthier air, water and soils; greenhouse gas emission reductions).

Sustainability includes environmental, economic and social considerations.

An Overview of BIOCAP's Programs

BIOCAP Mandate

...to provide the scientific insights, technologies and policy options to support the transition to a sustainable bioeconomy.

BIOCAP delivers a suite of integrated programs all focused on the creation of value to Canada and the transfer of knowledge to assist government and industry in meeting energy, economic and environmental objectives. **The organization's programs include partnership building, research funding and leverage, synthesis and integration, communications and administration.** Although other organizations may build partnerships, fund research and communicate results, BIOCAP has developed a unique and powerful model to establish, encourage and capitalize on research partnerships, delivering tangible products of value to stakeholders.

This report summarizes the Foundation's activities and accomplishments in FY 2006-07, recognizing support from and demonstrating accountability to key stakeholders. The report does not outline BIOCAP's future mandate.

Partnership Building

After 8 years of effort, the BIOCAP Canada Foundation has become a unique and influential force mobilizing the science and policy options for Canada's biosphere solutions for clean energy, climate change and economic development. Multi-sector cooperation and information exchange ensures relevance of the research, rapid uptake of the results and ultimately, more relevant policies, more competitive and successful companies and a cleaner environment.

Through personal contacts, workshops, committees and other networking vehicles, BIOCAP establishes and fosters contacts and interactions among key experts in government, industry, university and non-governmental organizations. This approach achieves strong engagement in the development and delivery of specific programs, ensuring relevance to stakeholders by identifying:

- Research gaps and priorities related to the emerging bioeconomy;
- Synthesis and integration requirements to best inform decision makers in government and industry;
- Needs for communication and knowledge transfer; and
- Optimal strategies for implementation.



BIOCAP's Board of Directors involves a broad range of key stakeholders. They provide a stable and powerful foundation, enabling the organization to build a multitude of partnerships with credibility and success.

The breadth and reach of BIOCAP's programs are also demonstrated by the diversity of government interest and engagement in BIOCAP's programs at the provincial level. BIOCAP interacts with more than 25 provincial departments across Canada.

BIOCAP Board of Directors:

- Provincial Gov'ts (Alberta, BC, Ont, Sask)
- Federal Gov't Depts (AAFC, EC, NRCan CFS and Energy)
- Oil and Gas companies (Shell, Suncor)
- Power Generation companies (BC Hydro, OPG, TransAlta)
- Heavy industry (Alcan, Dofasco, Lafarge)
- Biosphere sector (AIPac, Cdn Fert. Inst)
- Environmental NGOs (Pembina, Pollution Probe)
- Business Development NGO (Ag-West Bio Inc.)
- Universities (Board representation for 3 of the 34 which BIOCAP funds)

As of March 31, 2006, BIOCAP had built and reported on an impressive list of funding and research partners including industry (45), universities (32 Canadian, 6 international), NGOs (24), provinces (9), federal departments (4) and funding agencies (4), as summarized in the organization's FY 2005-06 Annual Report (p. 19). These partners are fully listed in the Foundation's 2002-2006 Activities & Accomplishments document (pp. 3-4), available on-line at www.biocap.ca.

BIOCAP has continued to encourage the engagement of partners during FY 2006-07. BIOCAP partners are defined as organizations which are providing cash and / or in-kind contributions to BIOCAP-funded research projects or initiatives. **Funding and research partners, new since April 1, 2006, include the following (+47):**

Industry (+17):

Advanced Biorefinery Inc.	Iogen Corporation
Agrium Inc.	Island Timberlands LP
Alcan Inc.	Nipawin Biomass Ethanol New Generation Co-operative Ltd.
BC Hydro	Pacific Regeneration Technologies Inc. Prince Albert
Canadian Forest Products Ltd.	Suncor Energy Products Inc.**
Concept Eco Plein Air le Baluchon	SunOpta Inc.
Domtar Inc.	TimberWest Forest Corp.
Ensyn Technologies Inc.	Zero Waste Energy Systems (ZWES)**
International Forest Products Ltd. (Interfor)	** <i>Conference sponsor</i>

Universities (+11):

Acadia University	Simon Fraser University
Hokkaido University, Japan*	State University of New York, USA
Lancaster University, UK*	University of Reading, USA*
North Carolina State University, USA*	University of Virginia, USA*
Oregon State University, USA*	York University
Royal Roads University Centre for Non-Timber Resources**	* <i>Universities with collaborators only</i>
	** <i>Conference sponsor</i>

Government (+3):

Alberta Sustainable Resource Development	Regional Municipality of Waterloo
Fisheries and Oceans Canada	

NGOs (+16):

Agence forestière de la Montérégie	Institut de recherche et de développement en agroenvironnement (IRDA)
Agence de mise en valeur de la forêt privée de l'Estrie	Le Centre SÈVE
Agence régionale de mise en valeur des forêts privées mauriciennes	Les Arpents Verts
Agricultural Research and Extension Council of Alberta	La Fédération des Producteurs de Bois du Québec
Canadian Standards Association – Climate Change**	Reseau Ligniculture Québec
Dairy Farmers of Canada	Saskatchewan Forest Centre
Dairy Farmers of Ontario	Tree Canada**
Grand River Conservation Authority	Trout Unlimited Canada
	** <i>Conference sponsor</i>

See Appendix A for a complete listing of all BIOCAP funding and research partners (Jan. 2002 – Mar. 2007).



Through a variety of mechanisms (conferences, workshops, presentations, introductions, website, etc.), BIOCAP developed several new collaborative relationships in FY 2006-07. Investing in collaborative relationships is very important as these relationships often set the foundation for future research partnerships. BIOCAP invested time and effort in building numerous collaborative relationships in FY 2006-07. Examples include:

Regional Municipality of Atikokan	Government of Ontario – Energy; Research & Innovation; Economic Development and Trade
Alberta Agricultural Research Institute	Government of Prince Edward Island – Agriculture
Alberta Science and Research Authority	Government of Quebec – Energy
Alberta Advisory Council on the Bio-Economy	In-Ventures
Bio-energy Focus Ontario (BEFO)	Kinetrics Inc.
BigLand Bio-Fuels Inc.	KMW Systems
Canadian Bioenergy Corporation	Mitton Valve Technology Inc.
Canadian Biotechnology Secretariat	Ontario Centre for Environmental Technology Advancement
CanBio	Philom Bios Inc.
Centre d'expertise sur les produits Agroforestiers	Queen's Institute for Energy and Environmental Policy (QIEEP)
Dow Chemicals	Scott Industrial Services
Environment and Economy Educators	Sustainable Energy Group Inc.
Government of Canada – Office of the National Science Advisor	University of Calgary's Institute for Sustainable Energy, Environment and Economy (ISEEE)
Government of Nova Scotia – Energy	Wood Pellet Association
Government of Newfoundland & Labrador – Natural Resources	

BIOCAP has developed novel and powerful tools for building a wide range of different partnerships, including multidisciplinary research groups, national research networks and commercialization partnerships. Its multi-sector committee structures create a dynamic forum to identify research gaps, priorities and implementation strategies across disciplines and sectors. The organization has also developed skills in finding, supporting and empowering leaders in the research community to step forward. BIOCAP has spear-headed a Network of interconnecting research Networks, where each network comprises 10 to 50 researchers and stakeholders with a mandate to address a certain area of the overall bioeconomy issue.

As part of the organization's 5 Year Funding Proposal, BIOCAP developed a draft framework for an integrated research program to support Canada's transition to a sustainable bioeconomy. This framework summarizes BIOCAP's proposed Network of Research Networks (*see Appendix B*) and highlights the relationships and synergies between networks and with established federal research networks. Implementation of this proposal will lead to strengthened networks and increased effectiveness and efficiencies in research and technology transfer in the area of the bioeconomy.

In February 2006, BIOCAP launched a program to support applicants to the federal Agricultural Bioproducts Innovation Program (ABIP). Through this initiative, BIOCAP worked with more than 25 groups (55% university, 40% industry, 5% other) to coordinate and strengthen network concepts and specific proposals prior to the ABIP application deadline (early May). BIOCAP support for ABIP applicants included:

- acting as a 'clearing house' for ABIP Projects and linking similar project teams together,
- helping to find key research, government and industry partners, and
- providing advice on Network Plans.

Research Funding & Leverage

Between Jan. 2002 and March 2006, BIOCAP invested \$6.8M directly into research and sponsored over 80 research projects. This investment attracted \$31.7M of additional funding for a total research investment of \$38.5M.

In JFM 2006, BIOCAP launched a national call for research proposals to address four targeted focus areas, shaped by industry and government partners of BIOCAP: Forests and Forestry, Aquatic Systems and Human Impacts, Agricultural Greenhouse Gas Management and Bioenergy and Bioproducts. BIOCAP received more than 90 proposals and supported approximately half for application to the NSERC Strategic Grants Program. **In October 2006, NSERC informed BIOCAP that 17 of the BIOCAP sponsored projects had been chosen for funding via NSERC's peer review process.** Despite intense competition, the funding success rate for BIOCAP sponsored projects (35-40% since FY 2002-03) is significantly higher than the average project success rate (20-25%).

These 17 new projects attracted total funding commitments of \$7.7M. BIOCAP's funding commitments to these projects (\$1.15M total over 3 years), conditional on the organization receiving sufficient and appropriate levels of long term funding from the federal government, provided the seed funding to attract \$6.5M of partner funding (> 5:1 leverage). BIOCAP also received confirmation of NSERC funding (\$360K) for a BIOCAP project in the CRD process and CFCAS



partnership funding (\$4M) for the Canadian Carbon Program, an extension of BIOCAP's Fluxnet Research Network.
The 19 new projects / programs are as follows:

Forests and Forestry

Black, Andrew. University of British Columbia.

Impact of nitrogen fertilization of coastal Douglas-fir stands in British Columbia on forest productivity, carbon sequestration and greenhouse gas emissions.

Campbell, Malcolm. University of Toronto.

Biomass improvements through genomics in Populus

Coops, Nicholas. University of British Columbia.

Predicting forest growth potential and climate change impacts using a MODIS satellite-constrained physiological model.

Margolis, Hank. Université Laval.

Canadian Carbon Program Research Network.

Plant, Aine. Simon Fraser University.

Developing tools to select for robust Populus genotypes capable of adapting to environmental change.

Aquatic Systems and Human Impacts

Dillon, Peter. Trent University.

Dissolved organic matter in aquatic systems: factors affecting its role in greenhouse gas formation.

Dillon, Peter. Trent University.

Catchment scale modelling of carbon fluxes in the Great Lakes basin.

Schiff, Sherry. University of Waterloo.

N₂O and N cycling in Canadian rivers: New isotopic tools for river science and management.

Agricultural Greenhouse Gas Management

Cahill, James. University of Alberta.

Understanding and mitigating the impacts of altered temperature and precipitation regimes on the function and biodiversity of rangeland communities.

France, James. University of Guelph.

Modelling the hydrogen economy of the rumen ecosystem to determine feeding management strategies for mitigating methane production from dairy cows.

VanRees, Ken. University of Saskatchewan.

Developing a Saskatchewan model for short rotation willow biomass production and GHG benefits.

Whalen, Joann. McGill University.

Environmental and economic benefits of tree-based intercropping (TBI) systems in Canada.

Bioenergy and Bioproducts

Abatzoglou, Nicolas. Université de Sherbrooke.

Development of catalysts for Fischer-Tropsch synthesis using biosyngas.

Clarke, Anthony. University of Guelph.

Biophysical studies on mechanisms of cellulose biodegradation.

Duff, Sheldon. University of British Columbia.

Processing of pyrolysis oils for co-product development and improved oil characteristics.

Kadla, John. University of British Columbia.

Self-assembly of ordered microporous materials from wood-based biopolymers.

Saddler, John. University of British Columbia.

The development of biorefinery technologies for conversion of softwood residues to ethanol and co-products.

Schlaf, Marcel. University of Guelph.

New ionic hydrogenation and hydrogenolysis catalysts for the deoxygenation of renewable sugar polyols and lignins to alpha, omega-diols and phenolics as polymer components.

Thomson, Murray. University of Toronto.

Development of a bio-oil stirling engine for sustainable power.



See BIOCAP report entitled “Summary of BIOCAP-funded Research Projects” for a complete listing of 125+ BIOCAP research projects and associated research funding.

Sponsorship and support of these research projects included an interactive multi-step process to:

Establish Research Priorities and Develop an Implementation Plan:

- develop and propose an initial framework for organizing research focus areas,
- engage the national (and international) research community,
- create and lead multi-disciplinary and multi-sector stakeholder advisory committees to identify research gaps and agree on critical research priorities,
- identify research leads,
- establish and launch targeted calls for proposals to address critical research priorities.

Develop Funding Strategies and Identify Funding Partners:

- identify potential funding mechanisms,
- develop a seed funding strategy via BIOCAP,
- identify potential industry (funding) partners and facilitate introductions to enable new partnerships.

Lead a “Fit to Program & Priorities” Review Process:

- develop and facilitate a fair process to organize and review applications,
- establish an unbiased ranking system,
- facilitate a multi-disciplinary and multi-sector stakeholder review process,
- synthesize input and feedback,
- recommend projects and funding to BIOCAP Board of Directors for approval, pending peer review.

Support Applications to Funding Agencies:

- write letters of support for project and network proposals,
- provide leadership and guidance in development of network strategies and proposals,
- provide support in preparing network proposals.

Ensure Accountability and Relevance:

- develop funding agreements with clear deliverables,
- release funds,
- track and report project timelines, research spending and research results.

Synthesize, Integrate and Communicate Research to Stakeholders:

- review quarterly reports and discuss progress / issues with researchers,
- synthesize and integrate research from multiple projects; articulate research insights via communications products,
- organize workshops, conferences, presentations, posters to facilitate knowledge transfer and partnership building.

BIOCAP's \$10M federal contribution agreement expired in March 2006. Interim federal support and additional industry and provincial sponsorship enabled BIOCAP to fund a portion of its programs in FY 06-07; however, these investments were not sufficient to enable the organization to meet research funding commitments (\$950K) payable to researchers in FY 06-07. As of March 31, 2007, BIOCAP still had a \$2.5M (FYs 06-09) outstanding balance in specific research funding commitments and was continuing to work with the federal government to secure funding for this research.

BIOCAP's programs have stimulated a total research commitment of \$51.9M cash in projects focused on finding biosphere solutions to the challenges of clean energy and climate change. Between Jan. 2002 – March 2006, BIOCAP leveraged a \$10 million federal investment to attract \$34.3 million (cash) for programs and research from private, provincial and university funding partners. **Between Apr. 06 – Mar. 07, BIOCAP attracted additional investments to its suite of programs totalling \$12.2M** (excluding BIOCAP's outstanding funding commitments).

When BIOCAP began in 1998, it was difficult to identify many researchers across Canada working in areas relevant to BIOCAP's goals. As a result of extensive outreach and recruitment efforts, the organization has stimulated widespread interest among Canada's research community in projects related to the emerging bioeconomy and has built a database of many hundred researchers across Canada who are interested in obtaining BIOCAP support for research. BIOCAP has directly funded several hundred university faculty. Although federal contribution agreements prevented BIOCAP from providing financial support to government researchers, many are involved as collaborators in BIOCAP-supported research initiatives, or as supervisors of graduate students supported by BIOCAP and its other funding partners.

The chart below summarizes the broad impact of BIOCAP's research funding programs including the training of highly-qualified personnel to meet the needs of industry and government:



BIOCAP Research Statistics Summary	Mar 07*	Mar 06	Increase in 2006-07 (18+ new projects)
Number of University Researchers	280	232	48
Number of Government / Industry Researchers / Collaborators	147	111	36
Number of Graduate Students, etc.	434	339	95
Number of Universities (Canadian)	38**	32	6
Number of Universities (international)	18	6	12
Number of Provinces	9	9	0
Number of Journal Articles***	tbd	152	tbd

* numbers are understated – totals do not include Canadian Carbon Program (CCP) statistics;

** 36 universities have received BIOCAP funds via PIs or Co-aps (university #s reported in Mar 06 understated);

*** includes published and accepted / in-press peer-reviewed journal articles produced by researchers funded in-part by BIOCAP

Synthesis and Integration

BIOCAP is much more than a traditional research program; it is also involved in synthesizing and transferring, to industry and government stakeholders, the knowledge from the past as well as insights and technologies from the national and international research and bioeconomy communities. This knowledge transfer is of high importance to stakeholders. **In FY 2006–07, BIOCAP produced and / or posted the following reports, presentations and proposals to disseminate knowledge.** Several of these products are available on-line at www.biocap.ca:

Reports for / Submissions to Government Departments / Agencies:

- Prime Minister's Office:
 - *A Pan-Canadian Strategy to Develop Energy and Environmental Technologies, Reduce Emissions and Mitigate Climate Change*
- House of Commons Standing Committee on Natural Resources:
 - *Towards a Sustainable Bioeconomy: Helping to Address the Greenhouse Gas and Energy Challenges of Oil Sands Development*
- Agriculture and Agri-Foods Canada, Environment Canada, and Natural Resources Canada:
 - *FY 06-07 BIOCAP Summary - Bioeconomy Projects & Investments in Canada* (CD)
 - *Towards a Sustainable Bioeconomy: 5 Year Funding Proposal*
 - *The BIOCAP Network of Networks*
 - *A National Bioenergy Database*
- Environment Canada:
 - *BIOCAP Response to Questions from Minister Rona Ambrose*
- Alberta Ministry of Environment:
 - *FY 06-07 BIOCAP Summary - Bioeconomy Projects & Investments in Alberta* (CD)
- BC Ministries of Forests and Range, and Energy and Mines:
 - *FY 06-07 BIOCAP Summary - Bioeconomy Projects & Investments in BC* (CD)
 - *Proposal for A Primer on Pursuing Biomass Energy Opportunities and Technologies in British Columbia*
 - *An Inventory of the Bioenergy Potential of British Columbia*
- Ontario Ministry of Environment:
 - *FY 06-07 BIOCAP Summary - Bioeconomy Projects & Investments in Ontario* (CD)
 - *Biomass Co-firing at Ontario Power Generation*
- Ontario Ministry of Energy:
 - *Thoughts on a Bioenergy R&D Initiative in Atikokan*
- Saskatchewan Ministry of Industry & Resources:
 - *FY 06-07 BIOCAP Summary - Bioeconomy Projects & Investments in Saskatchewan* (CD)
- Industry Canada / Canadian Biotechnology Secretariat:
 - *The Bioeconomy to 2030: A Global Opportunity (Natural Resource Biotechnologies)*

Synthesis Reports / Presentations / Materials for Stakeholders:

- *Summary of BIOCAP-Funded Research Projects*
- *BIOCAP-Funded Research Projects pertaining to the Reduction of GHG Sources and Enhancement of GHG Sinks*
- *A role for the Bioeconomy in addressing climate change and energy security: Transforming the rural economy*



- Scientific Briefs and Backgrounders:
 - *Impacts of Climate Change on Boreal Fire Regimes: The implications for regional and global carbon budgets and global warming*
 - *Air Quality: Energy from biomass can clean our air*
- *Ivey Forest Management Carbon Program Funding Proposal*
- International Bioeconomy Fact Summaries:
 - *The Bioeconomy in Asia*
 - *The Bioeconomy in Brazil*
 - *The Bioeconomy in Scandinavia*
- Towards a Sustainable Bioeconomy: Biosphere solutions for energy and the environment
 - *Conference Products CD*
 - *Conference Proceedings – An Executive Summary*
 - *Conference Perspectives:*
 1. *Transitioning to a Bioeconomy: The role of best management practices*
 2. *Growing the Bioenergy Industry in Canada: The challenges and opportunities of large-scale biomass production*
 3. *Transitioning to a Sustainable Bioeconomy: The role of offsets and emissions trading*
 - *Conference Program*
 - *Conference Presentations (>75)*
 - *Conference Posters (>65)*
- Canadian Bioenergy Challenge Dialogue:
 - *Final Report: Strategies for Strengthening the Bioenergy Sector in Canada*
 - *Workbook: A Growing Energy Strategy*
- Research Integration Program:
 - *Insights from the Research Integration Program*
 - 14 Strategic Synthesis Reports and Presentations:
 1. *Threats and Impacts of Exotic Pests under Climate Change: Implications for Canada's Forest Ecosystems and Carbon Stocks.*
 2. *Combined Forest Management Effect on Landscape Carbon Stock Changes in West-Central Canada*
 3. *Adapting Forest Management to the Impacts of Climate Change in Canada*
 4. *A Conceptual Comparison of Using Bioenergy Options for BC's Mountain Pine Beetle Infested Wood*
 5. *Whole Farm Modelling to Evaluate Economic and Production Implications of BMPs Designed to Reduce GHG Emissions – Case Study of Dairy Production in Coastal British Columbia*
 6. *The Potential for Agricultural GHG Emission Reductions in the Temperate Region of Canada through Nutrient Management Planning*
 7. *Disputes and Dispute Resolution in the Offset System*
 8. *Offsets for Carbon Sequestration in Agricultural Soil and Tradable Emission Permits for Large Final Emitters*
 9. *A Critical Cost Benefit Analysis of Oilseed Biodiesel in Canada*
 10. *Benefits and Costs of Shifts to Biomass Crops – Producer and Public Perspectives*
 11. *Cost benefit of Biomass Supply and Pre-processing Enterprises in Canada*
 12. *Optimum Sizing for Anaerobic Digestion*
 13. *Environmental and Social Benefits of 2nd Generation Biofuels in Canada*
 14. *Policies to Stimulate Biofuel Production in Canada: Lessons from Europe and the United States*

BIOCAP launched the Research Integration Program with the objective of synthesizing and integrating research insights on biosphere solutions to climate change and clean energy. The program embraced four theme areas: agriculture, forestry and natural ecosystems, bioenergy and policy. BIOCAP led a rigorous, multi-stakeholder process, and brought together Project Advisory Committees for each of the funded teams. After an intense three months of synthesis work, final reports were complete.

Communications and Outreach

BIOCAP excels at creating effective forums and communication vehicles to ensure the effective and efficient transfer of knowledge among key stakeholders and decision makers. BIOCAP's partnership building initiatives and communications programs lead to increased collaboration and knowledge sharing in the area of the bioeconomy between government, university and the private sectors. The organization demonstrates leadership for the



bioeconomy, articulating and promoting its benefits while simultaneously highlighting the challenges and need for a robust R&D program to ensure sustainability. **Communications initiatives in FY 2006-07 included the following events, programs and products:**

BIOCAP Communication Events

2007 CHEMRAWN-XVII and ICCDU-IX Conference on Greenhouse Gases:

BIOCAP has worked with the International GHG Conference Steering Committee to develop and host a Mitigation and Utilization session focused on biosphere solutions and carbon sequestration opportunities. This international climate change conference will be held in Kingston, Ontario, in July 2007.

2006 BIOCAP Conference:

On October 31 and November 1, 2006, BIOCAP Canada hosted *Towards a Sustainable Bioeconomy: Biosphere solutions for energy and the environment*. The two-day national forum was attended by 375 representatives from Industry, Federal and Provincial Governments, Non-Governmental Organizations, Environmental Organizations, and Academia who gathered in Ottawa to discuss and assess the science, policy and socioeconomic issues related to Canada's transition to a sustainable bioeconomy.

The conference was designed to build awareness and understanding of the opportunities that a bioeconomy offers Canada, identify and discuss the policies, tools and technologies that will enable such a transition and highlight some of the success stories both within Canada and abroad.

Presentations and discussions featured an almost universal recognition that Canada's abundance of forests and farmlands provide Canada with a "Green Advantage" for addressing issues of energy security, environmental health and the rural economy. Enthusiasm for bioeconomy opportunities was balanced by discussions on the economic and environmental sustainability of using Canada's resources.

Coordination, promotion and execution of the conference resulted in:

- 11 unique promotional / marketing emails *
- A 64 page Conference Program (English)
- A 64 page Conference Program (French)
- The BIOCAP Conference on DVD (*Video footage of Conference sessions*)
- A Conference Products CD (*Presentations, Posters, Photos*)
- Conference Overview – An Executive Summary
- Stakeholder packages
- A 375 delegate registration database *
- Feedback from many speakers and delegates

* provided to Environment Canada and AAFC as per federal contribution agreements

MP Reception:

On October 4th, 2006, The Honourable Peter Milliken, Speaker of the House of Commons, was the gracious host of a reception in honour of BIOCAP. The reception, which was held in the Speaker's private dining room on Parliament Hill, was attended by many Members of Parliament as well as representatives from industry, academia and Non Governmental Organizations. BIOCAP principals, as well as members of the BIOCAP Board of Directors and friends of the organization, took the opportunity to speak to MPs and guests about the importance of Canada's transition to a sustainable bioeconomy, and BIOCAP's role in enabling the transition.

BIOCAP Forums:

BIOCAP at the Engineering Institute of Canada: Climate Change Conference

On May 12th, 2006, BIOCAP hosted a Breakfast Symposium at EIC's Climate Change Conference. BIOCAP's symposium entitled *Biomass Opportunities: Climate change and energy solutions from Canada's forests and farmlands* featured presentations by David Layzell, President and CEO, BIOCAP Canada Foundation, Peter Flynn, Poole Chair in Management for Engineers, University of Alberta, Don Smith, Professor and Chair, Department of Plant Science, McGill University, and Janusz Kozinski, Director, Energy & Environmental Research Laboratory, McGill University. The session was attended by over 200 people.



The BIOCAP Research Integration Forum:

On April 27th, BIOCAP hosted 100 people at a groundbreaking event: *The BIOCAP Research Integration Forum*. The Forum marked the conclusion to BIOCAP's successful *Research Integration Program* and featured the presentation of insights from 14 synthesis reports (highlighted above). Researchers from across Canada, engaged in the preparation of the synthesis reports, presented their insights, conclusions and recommendations at the *Forum*. The event garnered a wealth of feedback from the engaged crowd which included MPs, policy advisors from federal and provincial governments, NGOs, industry and academia.

BIOCAP Workshops:

BIOCAP spear-headed a series of working meetings in JFM to develop a formal application to the Ivey Foundation to establish a multi-disciplinary **Forest Carbon Management Program**. The primary objective of the program is to integrate the science of forest management with market mechanisms and policy instruments to identify an innovative, yet practical strategy for implementing sustainable forest management practices that can generate large-scale CO₂ emission offsets in Canada by 2050. The research team anticipates feedback on the proposal in AMJ.

The **Biomass Crops Research Network** was a new initiative with a focus on developing innovative genotypes and production technologies to optimize Canada's biomass potential in an economically feasible and environmentally sustainable manner. A preliminary network proposal was developed and served as the focus of a workshop held in Ottawa in early November 2006. The workshop was attended by several key experts who identified a strong need for this initiative. Next steps included further development of the concept and discussions to help define the scope and objectives of this newly emerging network as a potential applicant to the Agricultural BioProducts Innovation Program.

The first **Bioenergy Systems and Logistics** workshop was held on October 30, 2006. The purpose of this workshop was to discuss a draft network proposal for this focus area which will cross-cut all Bioenergy production platforms. Several key points and themes emerged from the resulting dialogue, which were beneficial in strengthening the overall objectives of the network as outlined in the draft network proposal. BIOCAP has continued to work with many stakeholders to define this network's concept and value, and to develop funding strategies and timelines.

During the 2006 BIOCAP Conference, BIOCAP provided logistical support to, and participated in, two additional workshops, one entitled **Building a BC / Alberta Bilateral Strategy** led by the Governments of British Columbia and Alberta; the other led by **the Soil Conservation Council of Canada**.

The **National Aquatic Systems and Climate Change Research Network** (NASCC-RN) is an emerging BIOCAP network with a focus on understanding the impact of human activities on aquatic C and N cycles. BIOCAP is supporting four research projects directly affiliated with this network through NSERC/ BIOCAP funding agreements and also provides network support. Throughout FY 2006-07, BIOCAP organized a series of meetings and workshops held in different Canadian cities to bring together academic and government researchers and Canadian based organizations that have a strong commitment and active involvement in this research area. The purpose of these meetings was to advance the research strategy needed to achieve the network goals and objectives and to develop this strategy as part of a preliminary application to the NSERC strategic networks grant program. BIOCAP engaged several strategic partners in the project and facilitated the efforts of the research team to submit a formal funding proposal to NSERC's Strategic Network Grant program on March 30, 2007. The application package, which has strong industry endorsement, was submitted to NSERC on March 30th, although feedback on the proposal and its selection to move forward to the final stage of the competition will not be received before June 2007.

BIOCAP, in partnership with EnergyINet from Alberta, held a **National Bioenergy Dialogue Workshop**, entitled *A Growing Bioenergy Strategy*, in Ottawa on April 12-13, 2006. Engaging close to 200 leaders from across Canada, the Bioenergy Challenge Dialogue focused on building a strategy to grow the domestic bioenergy industry. The event created alignment between the 80+ participants on strategy components such as the magnitude of the potential, sector development support mechanisms, and R&D priorities. A major focus of the workshop was the formulation of several bioenergy "flagship projects" targeting specific Canadian opportunities. After enthusiastic discussion and debate, teams presented 8 project proposals in a marketplace forum. The National Dialogue concluded with the early-summer release of a final report, highlighted above.

Engagements:

BIOCAP provides national leadership on Canada's bioeconomy opportunity and how *Canada's Green Advantage* can contribute to climate change and energy solutions. Throughout FY 2006-07, the President and CEO was in high demand across the country and involved in speaking engagements, provincial and federal strategy sessions and training sessions. Highlights follow:



Speaker / Panel Member:

Sustainable Living Symposium (March)
Nature Count\$ (March)
Ontario Bioenergy Forum (March)
Ivey Foundation (March)
Soil Conservation of Canada AGM (March)
Energy and Environmental Systems Group (March)
FPT Working Group on Economic Analysis: *A role for the Bioeconomy in addressing climate change and energy security* (Feb)
Plant Bio Industrial Oils (Feb)
Farm Tech 2007: *Towards a Sustainable Bio-based Economy – New Opportunities for Agriculture* (Jan)
Hydrogen Fertilization of Soils (Jan)
House of Commons Standing Committee on Natural Resources: *Towards a Sustainable Bioeconomy: Helping to Address the Greenhouse Gas Emissions and Energy Challenges of Oil Sands Development* (Dec)
Queen's University: Commerce and Engineering Environmental Conference (Nov)
Atikokan Energy Committee: *A Bioenergy R&D Initiative* (Nov)
Dalhousie University, NS: *Towards a Sustainable Bioeconomy: Canada as a Bioenergy superpower* (Nov)
BIOCAP National Conference: *Towards a Sustainable Bioeconomy* (Oct)
Ag-West Bio Inc. Conference: *Biological Futures* (Oct)
10th National Forest Conference: *Towards a Sustainable Bioeconomy: Opportunities & Challenges* (Sept)
BioSpain Biotec 2006 Conference: *Towards a Sustainable Bioeconomy: A Canadian Perspective* (Sept)
CanBio Workshop, BC – *Where do we want to be in 3-5 years? How do we get there?* (Aug)
IEA Bioenergy Conference – *Biofuels and Bioenergy: Towards a Sustainable Bioeconomy: Opportunities & Challenges* (Aug)
Dow Chemicals (Aug)
World Congress on Industrial Biotechnology & Bioprocessing: *Towards a Sustainable Bioeconomy: Opportunities & Challenges* (July)
Agri-Food Innovation Forum: *Canada's Green Advantage* (July)
Ontario Ministry of Research & Innovation: *Early Researcher Awards*
EIC Climate Change Conference (May)
Eastern Ontario Conservative Caucus (May)
BIOCAP Research Integration Forum (April)
BIOCAP / EnergyINet Bioenergy Challenge Dialogue Workshop (April)
Post-GLOBE 2006 (April)

Participant / Consultations:

Forest Biodiversity / Renewable Fuels (March)
BioProducts Sask (March)
Energy Futures Report consultations (March)
PERD workshop (Feb)
OMAFRA consultations (Feb)
CFA – Renewable Energy in Canadian Agriculture (Feb)
Biorefineries conference (Feb)
CFCAS presentation (Feb)
NRTEE consultations (Jan)
Ontario Ministry of Research & Innovation workshop (Jan)
Canadian Biotechnology Secretariat consultations (Jan)



Alberta Sustainable Resource Development: Public Forest Scenario Project (Jan)
Ad-Hoc Technical Advisory Committee: Integrating Renewable Energy in the Agriculture Sector (Dec)
Green Crop AGM (Dec)
Natural Resources Canada Workshop: S&T Priorities (Dec)
Ontario MOE Roundtable: Ontario Climate Change Plan (Nov)
CanBio Bioenergy Working Group Meeting (Nov)
Fluxnet Canada AGM (Nov)
NRTEE: Long Term Energy & Climate Change Issues for Canada (Nov)
5% Renewable Fuels Technical Workshop (Sept)
BIOCAP AGM (June)
ELORIN AGM (June)
BIOCAP Board & Committee Meetings (quarterly)
ELORIN Board Meetings (quarterly)
Fluxnet Board Meetings (quarterly)
Green Crop Board Meetings (quarterly)

BIOCAP Communication Products

Activities & Accomplishments Document

BIOCAP prepared this A & A document to summarize the organization's role during FY 2006-07 in supporting Canada's transition to a sustainable bioeconomy. This document meets several requirements of BIOCAP's 2006-07 federal contribution requirements.

Brochure

In October 2006, BIOCAP created a new brochure that communicates the importance of transitioning to a sustainable bioeconomy and BIOCAP's role in facilitating this transition. The eight page bilingual brochure was first distributed at the BIOCAP conference and was a key marketing document, in combination with the Annual Report, throughout the remainder of FY 2006-07.

Annual Report

In September 2006, BIOCAP distributed its 5th Annual Report (FY 2005-06) to hundreds of stakeholders in industry, government, academe and non-government organizations. The 84 page bilingual report profiles the organization's results that have been achieved through BIOCAP's research programs and "network of research networks". The report includes careful documentation of BIOCAP-funded research projects and highlights BIOCAP's actions and programs to build the foundation for its research programs and enable synthesis of results. .

Briefing Documents

BIOCAP prepared numerous briefing documents to communicate how BIOCAP's programs can contribute to achieving government priorities, both in the short term and the long term. The briefing documents also outlined BIOCAP's request for renewal of long term funding.

In the News

In The News, BIOCAP's digest-style biosphere news service continued to grow in popularity with over 700 subscribers receiving the weekly instalments.

Website

In addition to routine updates and upgrades on the BIOCAP website (many of such changes stimulated by user feedback), a new series of pages were created to help manage the marketing and registration components of the BIOCAP Conference. Most delegates registered using the new, secure, payment functions and at the beginning of November 2006, the conference pages were fully populated with downloadable presentations and posters from the conference.

Bulletins

BIOCAP released the 3rd edition of the BIOCAP Bulletin in May 2006. The newsletter-style bulletin highlighting BIOCAP news and results was distributed in hard-copy to a targeted audience across the country. Plans to distribute the fourth BIOCAP Bulletin early in the New Year were put on hold, waiting for clarity on long term funding and future mandate.



Media

BIOCAP was featured in several major news stories in 2006. Highlights follow:

- A CBC National report on cuts to climate change programs featured BIOCAP President and CEO David Layzell who described the organization's on-going efforts to renew its federal funding in order to continue valuable programs on the development of clean energy from renewable biomass.
- A Toronto Star article highlighted a BIOCAP report that found biomass resources in Ontario could provide 27 percent of the province's current energy demand and that Canadian forests and farmlands offer substantial energy potential.

The following lists significant media coverage which profiled the work of BIOCAP (April 1, 2006 – March 31, 2007):

Source	Title	Author	Date
Toronto Star	"Turning Slash into Cash"	Tyler Hamilton	October 30, 2006
TV Ontario: The Agenda With Steve Paiken	"Climate Change Connundrum"	Steve Paiken	October 6, 2006
CBC: Quirks & Quarks	"Biomass"	Bob McDonald	September 16, 2006
Technology Review	"Turning Slash into Cash"	Tyler Hamilton	August 15, 2006
Energy Evolution	"BIOCAP Says Ontario Needs To Support Bioeconomy"	Stephen Marsters	June 19, 2006
Vancouver Sun	"Beetle Killed Wood Could be Fuel"	B. Morton	June 1, 2006
Vancouver Times Colonist	"B.C. ready to burn pine-beetle wood"	CanWest	June 1, 2006
Energy Evolution	"BIOCAP's Federal Funding Lapses Amid Program Review"	Stephen Marsters	May 22, 2006
CBC: The National	"Conservative Cuts to Climate Change Funding"	Margo McDiarmid	April 5, 2006

Administration

Since incorporation (2000), BIOCAP has used KPMG as its auditor. Every year the foundation earns an excellent report for comprehensive record keeping that meets all the requirements of its funding bodies. The Board of the Foundation has a formal and active Audit and Finance Committee which takes very seriously the issue of accountability for the foundation's resources.

BIOCAP finalized its third comprehensive analysis of research spending to demonstrate research funding accountability. After much follow-up throughout the year, the final report concludes that **research spending and programs were on track for 100% of BIOCAP-funded projects.**

Given the limitation of resources, BIOCAP leverages excellence where it already exists. The organization works with existing administrative structures to leverage resources from other stakeholders to achieve common goals. Additionally, because BIOCAP works closely with researchers and the user communities to develop and focus their research proposals, it is important for the Foundation to rely on others for peer review processes. By partnering with granting agencies (NSERC, SSHRC etc), BIOCAP gets expert peer review as well as strong leverage on its investment.

Summary

BIOCAP began in 1997 with the concept that Canada's biological systems (especially forests, farmlands and aquatic systems) could help Canadian industry and society move towards environmental sustainability by providing emission reduction offsets and a source of clean, renewable energy. Over the past eight years, BIOCAP has demonstrated its leadership and effectiveness in developing partnerships, strategies and research programs to address the challenges of climate change and clean energy through biological solutions.

The organization has been on the forefront of Canada's transition to a sustainable bioeconomy and BIOCAP has received accolades for the work it has done in increasing the profile of, and investment in, bioeconomy research across Canada.



Appendix A

BUILDING MULTI-SECTOR FUNDING & RESEARCH PARTNERSHIPS

Complete Listing of BIOCAP's Funding & Research Partners (January 2002 – March 2007)

Note: Direct Financial Sponsors or Board members of BIOCAP are **bold-underlined**; other partners are cash or in-kind funding sponsors of BIOCAP-initiated research programs and / or partners engaged in the actual research.

Industry Partners (81)

Abitibi Consolidated Inc.
Advanced Biorefinery Inc.
Agribiotics
Ag. Soil Science, GIS & Environment Consulting
Agrium Inc.
Alberta Pacific Forest Industries
Alcan Inc.
Atofina Chemicals Inc.
BC Hydro
BIOX Corp.
Boreal Ecosystems Research Ltd.
Boreal Laser Inc.
Bowater Inc.
Canadian Fertilizer Institute
Canadian Forest Products Ltd. (CanFor Ltd.)
Commercial Alcohols Inc.
Concept Eco Plein Air le Baluchon
DMI Industries
Dofasco Inc.
Domtar Inc.
DuPont
Enerkem Inc.
Engine Control Systems
Ensyn Technologies Inc.
ENVINT Consulting
Environmental Waste International
Ferti-Val Inc.
Ford Motor Company
Forest Protection Ltd.
Forintek Canada Corp.
Fraser Inc.
Fuel Cell Technologies (FCT)
GeoLogic Solutions
Husky Oil
Hydromantis Inc.
Imperial Oil
Innovation Expedition
Inspired Value Inc.
International Forest Products Ltd. (Interfor)
International Truck & Engine Company (ITEC)
Intersan Inc.
logen Corporation
Island Timberlands LP
JD Irving Ltd.
Jim Fenton & Associates
Kingston Process Metallurgy Inc.
Lafarge Canada
Lignol Innovations Corporation
Little Red River / Tall Cree Nations (LRR/TC)
Manitoba Hydro
MapleLeaf BioConcepts
Moose Cree First Nations (MCFN)
National Utility Investors
Neoteric Biofuels Ltd.
Nipiwán Biomass Ethanol New Generation Co-operative Ltd.
Northstar Engineering
Okanagan Biofuels
Ontario Power Generation
Pacific Agri Tech Ltd.
Pacific Regeneration Technologies Inc. Prince Albert
Plasco Energy Group
Reductase Consortium (Ambio, Innovera, Spec)
Rio Tinto Iron & Titanium Inc.
SaskPower Shan Greenhouse
Shell Canada
Soil Resource Group
Suncor Energy Inc.
Suncor Energy Products Inc.
SunOpta Inc.
Syngenta Biotechnology
Synodon Inc.
Tembec Inc.
Terre Vista Earth Imaging
Thomsen Corp.
TimberWest Forest Corp.
TransAlta Corporation
TransCanada
Western Forest Products Ltd.
Weyerhaeuser Company
Zenon Environmental Inc.
Zero Waste Energy Systems (ZWES)

NGO Partners (53)

Ag-West Bio Inc.
Agence forestière de la Montérégie
Agence de mise en valeur de la forêt privée de l'Estrie
Agence régionale de mise en valeur des forêts privées mauriciennes
Agricultural Research and Extension Council of Alberta (ARECA)

Auto21
 BioProducts Canada
 Canadian Agriculture New Uses Council
 Canadian Agri-Food Research Council (CARC)
 Canadian Cattlemen's Association
 Canadian Climate Impacts & Adaptation Research
 Network (C-CIARN)
 Canadian Foundation of Climate & Atmospheric
 Sciences (CFCAS)
 Canadian Foundation for Innovation
 Canadian Institute Research Law
 Canadian Parks & Wilderness Society
 Canadian Pork Council
 Canadian Renewable Fuels Association
 Canadian Standards Association – Climate
 Change
 Centre for Ecology and Hydrology (CEH)
 Centre for Studies in Agriculture, Law and the
 Environment (CALE)
 Dairy Farmers of Canada
 Dairy Farmers of Ontario
 Ducks Unlimited Canada
 EnergyINet
 Fédération des Producteurs de Bois du Quebec
 Fluxnet Canada
 Forest Engineering Research Institute of Canada
 (FERIC)
 Grand River Conservation Authority

Green Crop Network
 Greenhouse Gas Management Canada (GHGMC)
 Institut de recherche et de développement en
 agroenvironnement (IRDA)
 International Rice Research Institute, Philippines
 Jardin Botanique de Montreal
 Lake Abitibi Model Forest
 Le Centre SÈVE
 Les Arpents Verts
 National Resource Energy Lab (NREL)
 Northern Climate Exchange
 Northern Development Initiative Trust (NDI)
 Nova Scotia Federation of Agriculture
 Ontario Soil and Crop Investment Association (OSCIA)
Pembina Institute for Appropriate Development
Pollution Probe
 REAP-Canada
 Reseau Ligniture Quebec
 Royal Society of London
 Saskatchewan Canola Development Commission
 Saskatchewan Forest Centre
 Societe de Protection des Forets contre les Insectes et les
 Maladies (SOPFIM)
 Soil Conservation Council of Canada
 Sustainable Forest Management NCE
 Tree Canada
 Trout Unlimited Canada

Government Partners (48)

Agriculture & Agri-Food Canada

Alberta Agriculture, Food and Rural Development
 Alberta Sustainable Resource Development
 Biotechnology Research Institute, NRC
 Canada Research Chair
 Canadian Biomass Innovation Network (CBIN),
 Industry Canada
 Canadian Centre for Remote Sensing, NRCan
 Canadian Forest Service, NRCan
 CANMET Energy Technology Centre, NRCan

Environment Canada

Fisheries and Oceans Canada
 GHG Mitigation Program, AAFC

Government of Alberta

(Ministries of Environment, Science and Innovation)

Government of British Columbia

(Ministries of Forests and Range, Energy, Mines &
 Petroleum Resources, Environment, Agriculture &
 Lands, Economic Development)

Government of Ontario

(Ministry of Environment)

Government of Saskatchewan

(Ministry of Industry & Resources)

Manitoba Agriculture
 Manitoba Conservation
 Meteorological Services, Environment Canada

Ministère du Développement Durable, de l'Environnement
 et des Parcs du Quebec
 National Research Council of Canada

Natural Resources Canada

Natural Sciences & Engineering Research Council of
 Canada (NSERC)
 New Brunswick Ministry of Natural Resources
 Newfoundland Department of Fisheries and Agriculture
 Northeast Science and Information, OMNR
 Nova Scotia Department of Agriculture and Fisheries
 Nova Scotia Department of Natural Resources
 Ontario Centres of Excellence
 Ontario Forest Research Institute, OMNR
 Ontario Ministry of Agriculture, Food & Rural Affairs
 Ontario Ministry of Natural Resources (OMNR)
 Pacific Forestry Centre, CFS, NRCan
 Plant Biotechnology, NRC
 Prairie Farm Rehabilitation Administration, AAFC
 Quebec Ministry of Forests
 Regional Municipality of Waterloo
 Sask Enviro
 Saskatchewan Research Council
 Social Sciences & Humanities Research Council (SSHRC)
 Toronto Works and Emergency Services
 U.S. Geological Survey
 Wastewater Technology Centre, Environment Canada

University Partners (56)

Acadia University
Colorado State University, USA*
Concordia University
CSIR – Delhi University*
Dalhousie University
Eidgenössische Technische Hochschule, Zürich*
Harvard University, USA*
Hokkaido University, Japan*
International Christian University, Japan*
Kyushu University, Japan*
Lakehead University
Lancaster University, USA*
Laurentian University*
McGill University
McMaster University
Memorial University of Newfoundland*
North Carolina State University, USA*
Nova Scotia Agricultural College
Oregon State University, USA*
Queen's University
Royal Military College of Canada*
Royal Roads University**
Royal Veterinary & Agricultural University, Denmark*
Ryerson University
Saint Mary's University
Simon Fraser University
State University of New York, USA*
Trent University
University of Alberta

University of British Columbia
University of Calgary
Université de Caxais de Sol*
University of Guelph
University of Hamburg*
Université Laval
University of Lethbridge
University of Manitoba
Université de Montreal
University of Moncton
University of New Brunswick
University of Ottawa
Université du Québec
University of Reading, USA*
University of Regina
University of Saskatchewan
Université de Sao Paolo*
Université de Sherbrooke
University of Toronto
University of Victoria
University of Virginia, USA*
University of Waterloo
University of Western Ontario
University of Windsor
Wageningen University, Netherlands*
Wilfred Laurier University
York University

* *Universities with collaborators only*

** *Conference sponsor*



THE BIOCAP NETWORK OF NETWORKS



... Supporting the Transition Towards a Sustainable Bioeconomy

Goals

Quantify to Predict

... carbon and nitrogen cycling

Improve Environmental Footprint

... in managing forests, agricultural & aquatic systems

Produce Biomass Sustainably

... through improved mgmt strategies & new technologies

Use Biomass Sustainably

... through new technologies and implementation strategies

Forestry and Natural Ecosystems

Fluxnet / Canadian Carbon Program

Understand how climate and disturbances (natural and human) affect carbon and energy cycles in Canada's forests.

National Forest Research Institutes (industry-federal gov't network)

Sustainable Forest Management NCE (BIOCAP Component)

Understand and assess the environmental and socio-economic implications associated with managing Canada's forests for enhanced carbon stocks or for bioenergy production.

Aquatic Systems and Climate Change

Understand how carbon and nitrogen cycling in aquatic systems are impacted by climate change, nutrient loading, acid rain and water impoundment and develop optimal management strategies.

Agriculture

Environmental Goods and Services in Agriculture

Identify management strategies, develop new technologies and assess socio-economic impacts of efforts to reduce agriculture's environmental footprint.

Green Crop

Develop insights and technologies to create new crops that produce less N₂O, enhance soil C stocks, benefit from elevated CO₂, and produce oil-based biofuels.

Biomass Crops

Develop insights and technologies to create new lignocellulosic bioenergy crops; assess socio-economic and policy implications.

Bioenergy and Bioproducts

Develop the insights and technologies to inform policy and investment decisions related to the harvesting, transportation, conversion and use of biomass as a source of energy and associated bio-products. The research will be organized into four platforms:

- Waste Platform (MSW, manure)
- Sugar Platform (ethanol, butanol)
- Oil Platform (biodiesel)
- Thermal Platform

And three cross-cutting themes:

- Systems and Logistics
- Biorefinery
- Socio-economics and policy

Canadian Biomass Innovation Network (CBIN)

(federal gov't network)

Capturing Canada's Green Advantage

