

SusChemAlliance

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Industrial Biotechnology and Canada's Role for the Future

This world is starting to seriously embrace industrial biotechnology, with growing recognition of the positive impact on the reduction of CO₂ emissions. In Europe, the policy is around "white biotechnology" which is industrial biotechnology. The European Union has a number of programs to encourage development of this sector. Europe has a long-term focus on moving to a sustainable technology which will use industrial (white) biotechnology as a key to getting there.

Recently the World Wildlife Fund produced a global study and report "Industrial Biotechnology - more than green fuel in a dirty economy?" The report (www.energyboom.com/category/tags/wwf) identified four fundamental dimensions of the continuation of industrial biotechnology: improved efficiency, the substitution of fossil fuels, the substitution of oil-based materials and the creation of a closed-loop system with the potential to eliminate waste.

Europe, the World Wildlife Fund and several countries have embraced industrial biotechnology. Canada needs to step up and ensure that we have appropriate policies in place to capture the benefits of the bio-based economy.

A report by BIOTECCanada "The Canadian Blueprint - Beyond Moose and Mountain - How we can build the world leading bio-based economy" provides some good recommendations. This blueprint (www.biotech.ca/en/policy-matters/beyond-moose-and-mountains.aspx) is a call to action for Canada.

We need to embrace biotechnology and the bio-based economy as catalysts for our next wave of innovation and prosperity. Having a sustainable and green economy is no longer mutually exclusive. Biotechnology is key to having both, and Canada is perfectly positioned to have both capacities as we possess one of the world's largest and most impressive bio-mass supplies. It is up to us to capitalize on the opportunity.

We are just beginning to move in that direction but still need to continue to work on regulation and policies that will help to expedite movement to a bio-based economy, and give us a world leadership role. At the Sustainable Chemistry Alliance (SCA), which is supported by the Centres of Excellence for Commercialization and Research (CECR), we are focused on the commercialization of sustainable technologies and green chemistry. To date, we have approved investments in five businesses that are approaching commercialization of their technologies.

SCA is one small piece of a much needed focus on the industrial biotechnology sector for Canada. Other countries are stepping up to capture this sector, and even the World Wildlife Fund is endorsing industrial biotechnology as the one sector that can truly reduce greenhouse gas.

As stated in the BIOTECCanada report: "The challenge is to engage all Canadians in building a bio-based economy that becomes the foundation for a safer, cleaner, healthier and more sustainable future." Let's meet the challenge.

Expansion Underway: Suncor's Ethanol Plant Benefits from EcoEnergy for Biofuels Program



With the recent decision to move forward on a \$120 million expansion, Suncor Energy has confirmed its commitment to grow Canada's largest ethanol facility - the St. Clair Ethanol Plant near Sarnia.

The Phase 2 project, expected to be completed in late 2010, will double the plant's ethanol production capacity to 400 million litres per year from 200 million litres. Ethanol is a fuel additive made by distilling corn or other organic matter. Corn ethanol is produced from corn as a biomass through industrial fermentation, chemical processing and distillation.

With signs of an improving business climate, Suncor reactivated the project after announcing its deferral in early 2009. Construction of the original facility created about 250 jobs and 46 full-time staff operate the facility. The expansion will create approximately 250 construction jobs and add another 12 full-time positions. Andre Boucher, GM Ethanol Operations, joined Suncor in 2005 to manage and prepare for the opening of the company's ethanol plant in 2006 and will oversee the current expansion.

On completion of the expansion, the plant will require about 40 million bushels of corn annually from local farmers. The plant currently uses 20 million bushels of corn annually, approximately

10% of Ontario's annual corn crop. The type of corn used as feedstock has traditionally been used to feed livestock.

Once the starches are extracted from the corn to make ethanol, the remaining elements are used to make premium cattle feed.

Phase 1 of the facility, which opened in 2006, has received a federal funding commitment of up to \$109.97 million, over the next seven years. The funding is part of an ecoEnergy for Biofuels program and will be used as a sliding subsidy for ethanol produced at the existing plant. The ecoEnergy program is intended to help the Canadian renewable fuel industry and has a budget of \$1.5 billion over nine years to fund biofuel production through to the end of March 2017.

The Pembina Institute for Appropriate Development conducted a Life Cycle Value Assessment for the plant and estimated that overall CO₂ emissions could be reduced by up to 300,000 tons per year by blending 10% ethanol from the St. Clair plant into gasoline. With the planned expansion of the St. Clair Ethanol plant, that environmental benefit is expected to double to up to 600,000 tonnes of greenhouse gas reductions annually.

Suncor has made a significant stake in Canada's emerging biofuels industry and is using revenues from oil sands development to invest in biofuels. Jay Thornton, executive vice president, energy supply, trading & development, describes the St. Clair facility as the platform for growth of Suncor's biofuels portfolio.

The ethanol production industry is expanding in Canada and the United States. New government regulations require that a percentage of ethanol be blended into fuels to reduce the environmental impacts of vehicle emissions.



Since 2006, Suncor has been making a significant impact in Canada's emerging biofuels industry. Suncor is using revenues from oil sands development to invest in biofuels, particularly ethanol produced from corn. Ethanol is a cleaner burning, renewable resource.

FPIInnovations and CRIBE Partner to Develop Forest Bio-Economy in Ontario



A new partnership has been created between the Center for Research and Innovation in the Bio-Economy (CRIBE) and FPIInnovations, to facilitate the transformation of the Ontario forest sector through the adoption of innovative technologies related to the forest bio-economy. The new Partnership will promote the development of innovative technologies which use renewable resources such as trees and forest bio-residuals. It will employ existing infrastructure and engage industrial partners in developing bio-refinery pilot plants to evaluate promising technologies and new concepts and validate ideas relevant to the bioeconomy.



Jean Hamel

Vice-President of the Pulp and Paper Division of FPIInnovations and a Director of the SCA.

It supports the pre-commercial demonstration of bio-economy technologies with a view at attracting new entrants related to the emerging forest-based bio-economy to Northern Ontario. The new partnership will also engage universities and colleges more systematically in the pursuit and delivery of an innovation agenda for the forest sector including the creation of a skilled workforce to support bio-economy initiatives.

In partnership with Natural Resources Canada (NRCan), FPIInnovations will contribute equally with CRIBE, to the funding required to establish new scientific and technical capacity to support the pre-commercial demonstration of promising technologies related to the forest bio-economy in Northern Ontario. Under this new agreement, each of the parties will contribute up to \$1 million per year for the next four years to establish this capacity.

In addition, the parties in conjunction with their respective government partners, NRCan and the Ontario Ministry of Research and Innovation, will provide up to \$20 million in funding over the next four years towards pre-commercial demonstration projects of promising technologies for Northern Ontario.

"This innovative approach is geared toward developing new scientific and technical capacity using forest biomass, pilot plant capabilities and pre-commercial demonstration projects in Northern Ontario," says Pierre Lapointe, President and CEO for FPIInnovations. "The engineering and technical studies are focused on three alternatives: lignin, methanol, and hemicellulose. Our aim is to identify technical and business challenges around extracting and reusing these products. I have great hope for this partnership

and the new possibilities it represents for the Ontario forest industry."

The new Forest Bio-Economy Program builds on FPIInnovations' Transformative Technology Program which is funded by NRCan over the past two and half years. The latter establishes the technical base of several new technologies and in turn will support knowledge transfer and timely adaptation of bio-products for the benefit of Northern Ontario.

CRIBE CEO Lorne Morrow says the government of Ontario has recognized the need to move the province to the forefront of the commercialization of chemicals, fuels, fibres and energy that can be produced from forests. "There is a significant opportunity to move products derived from the forest up the product value chain, using our forest fibre to produce higher value, novel products while reducing costs of manufacture for the more traditional forest products."

CRIBE was established in 2009 by the Province of Ontario to support new job and business creation in the bio-economy sector using forest biomass from Northern Ontario. CRIBE seeks out partnerships with entrepreneurs, research organizations and industry with the specific purpose of turning existing research and ideas into a commercial reality.

FPIInnovations is a not-for-profit Canadian forest products research institute that performs research, technical services and tech transfer activities relating to wood harvesting, wood products, pulp and paper, nanotechnology and bio-energy and chemical production.



FPIInnovations came into existence in 2007 through an amalgamation of Forintek Canada Corporation, the Forest Engineering Research Institute of Canada (FERIC), and the Pulp and Paper Research Institute of Canada (Paprican), along with the Canadian Wood Fibre Centre of Natural Resources Canada. Each of these institutes focused on different areas of the Canadian forest industry, and now operate as divisions within FPIInnovations. With a staff of over 600, the institute has research laboratories located in Quebec City, Montreal and Vancouver, and it has technology transfer offices across Canada.

CCPA Evolves into Chemistry Industry Association

In October, 2009, The Chemistry Industry Association of Canada became the new name of the association formerly known as the Canadian Chemical Producers' Association (CCPA). This major change in name and mandate stems from a refocusing of some of the activities of the association and a widening of its membership criteria to better reflect the changes occurring in the chemistry industry. The new association now represents a broader cross-section of the chemistry industry, expanding its membership to encompass other players and partners in Canada who want to join its push towards sustainability by being Responsible Care practitioners. New members might include companies related to chemical manufacturing such as services, technology and resale.

Through Responsible Care, association companies are devoted to sustainability and to finding solutions to the world's toughest problems including energy conservation, water quality, greenhouse gases and product stewardship throughout the value chain. The Chemistry Industry Association acts as the voice of Canada's business of chemistry and represents over 50 companies and Responsible Care partners ranging from 5-5,000 employees operating in the chemistry industry. Member companies are responsible for some 200 sites across the country that produce basic chemicals and resins for manufacturing processes, as well as provide technology, services, marketing and research and development for chemical products. The chemistry industry is positioned at the crossroads between Canada's resource base - including mining, forestry, agriculture and oil and gas - and Canada's manufacturers, including the food and beverage sector, construction, plastics and rubbers, textiles and clothing, electrical and electronics and transportation equipment.

Together, the companies of the Chemistry Industry Association of Canada generate revenues of more than \$26 billion annually, accounting for the majority of operations in Canada. The Association was created in 1962 and renamed in 2009 to better reflect the changing nature of this dynamic industry. The Association has three main objectives: be competitive, be responsible, be credible. Through these objectives, and governed by an active member-base, the association has developed a strong reputation as a pragmatic, policy-based, problem-solving organization. It represents members' interests based on solid analysis. The Chemistry Industry Association of Canada works cooperatively with governments and other groups to find solutions that benefit both Canadian society and the nation's chemical industry.

The Responsible Care initiative is considered the chemistry industry's most outstanding achievement. It was established in 1985 to address public concerns about the manufacture, distribution and use of chemicals following the chemical spill in Bhopal, India in December 1984. Since its inception, Responsible Care has guided the chemical industry in Canada and has been adopted all around the world. In 2008, Responsible Care was reviewed to add sustainability as its driving force.

Sustainable Chemistry Alliance director Richard Paton became President of CCPA in 1996 and has guided it through its transition into the Chemistry Industry Association. According to the CCPA's year-end survey, the chemistry industry fared no better than other manufacturing sectors in 2009. Recessionary forces were primarily responsible for a sharp decline in sales of basic chemicals and resins in 2009 – a decrease of 35% to \$16.6 billion from 2008 levels in current dollars.



Richard Paton

President of the Chemistry Industry Association and a Director of the SCA.



Chemistry Industry Association of Canada

Currently, there are two kinds of members in the Association. The first are members, which include companies that manufacture, blend or formulate chemicals and companies that sell and re-sell chemicals in Canada. The association is known for its representation of large chemical producers and is now expanding its membership along the chemistry value chain. New members include services such as waste management and technologies related to the chemistry industry. In the future we will represent nanotechnology companies and bio-based feedstock producers.

Responsible Care partners are companies that directly manage chemicals (transport, store, use, recycle, dispose of, etc.), but do not manufacture or blend/formulate chemicals. Commitment to the ethic, codes, verification and other expectations of Responsible Care is a requirement of partnership.

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