

CHALLENGES



PHOTO: SWITCHSOL

Innovation doesn't have to mean pollution. The practice of using sustainable methods in scientific endeavours isn't new. However, a renewed focus on the economic possibilities has emerged that could green the industry nation-wide.

A hybrid of opportunity

By definition, green chemistry is “the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design manufacture and application of chemical products.”

Simply put, it is chemicals made from renewable resources. It is not a new concept or idea; in 1941, Henry Ford unveiled what was called a “field grown” plastic car. The body was made of plastic which was 30 percent derived from soybeans and 70 percent from wheat straw and hemp. The horn buttons, gearshift knobs, timing gears and accelerator pedals were derived from soybeans.

The tires were made from plant-based rubber latex. Ford came up with the idea during the depression and enhanced the need for plant based plastics. However, the end of World War II opened access to oil supplies globally and created the dawn of the petrochemical age. For the next 60 years the petrochemical industry has driven significant global growth and an expanded chemistry industry from oil.

Recognizing the benefits of “green”

However cost, health, environmental and security concerns today are creating a shift to green and sustainable technologies and products. Transformation and development of a hybrid chemistry industry will set the standards for the 21st century.

Canada is in a unique position to become a global leader in the world of green chemistry. We have the resour-

ces in agricultural, forestry and waste materials to create a green and hybrid chemistry industry. The knowledge is within our universities, government research facilities and other areas of the world that need products from our natural resources.

Attempting to implement change

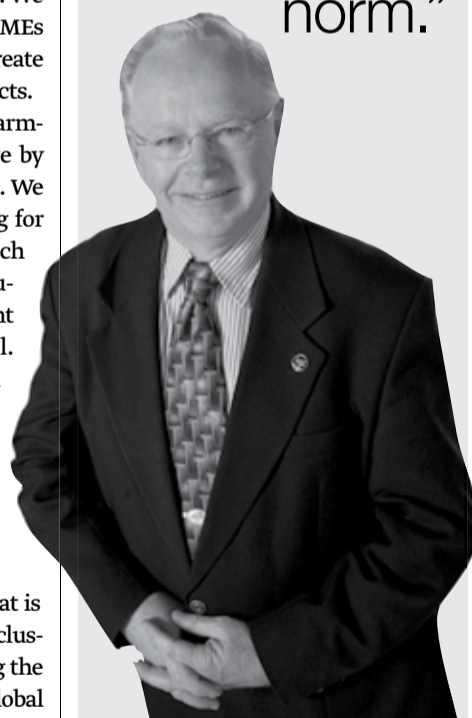
There will be a transition era of several years where we will see hybrid chemistry be established as the norm—a combination of chemistry from crops and trees combined with petrochemicals to create improved and new products. At the same time some green chemistry products will stand on their own merit as they are developed. We will see partnerships form with SMEs and multinational companies to create the transformation and new products.

Canada has an abundance of farmers willing to step into the future by growing new crops for new uses. We have a chemistry industry looking for new opportunities to expand, such as Woodbridge Foam, which produces car seat foam using 20 percent soybean oil plus petroleum oil. There's also GreenCore, which makes natural fibre composite pellets for the plastic industry with material from forestry that improves strength and quality.

An innovative hot spot

Sarnia, Ontario, is a community that is building a green and sustainable cluster around chemistry, and is setting the tempo for Canada to become a global leader—they've established a Research Park, managed by University of Western Ontario. The Bioindustrial Innovation

“There will be a transition era of several years where we will see hybrid chemistry established as the norm.”



Dr. Murray McLaughlin
Sustainable Chemistry Alliance;
Bioindustrial Innovation Centre

Centre (BIC) and Sustainable Chemistry Alliance (SCA) are located in the Park to assist with building the cluster. BIC is a Centre of Excellence for Commercialization and Research (CECR) funded by the federal government and is focused on green and sustainable chemistry development and commercialization focused on managing a lab and pilot facility that companies can lease to develop their technology.

The SCA is an organization supported by BIC that is an investment vehicle for green and sustainable technologies. To date SCA has completed 11 investments for approximately 5.2 million dollars across Ontario. These investments have raised over 100 million dollars in additional investment; 300-plus direct jobs and are positioning Canada as a leader in green technology. Ecosynthetix is one investment in Burlington, Ontario that produces a latex polymer for paper coatings, replacing petroleum-based coatings. Bioamber is another that will build their first full scale production facility for bio-based succinic acid in Sarnia. Both companies are examples of green chemistry businesses that are becoming global players by producing products from plant based materials to replace petroleum based products.

In this report, you will discover the potential uses of green chemistry and understand the link and the power potential behind bioenergy (biomass and biofuels) Our goal is to bring your attention to these initiatives putting Canada on the map as leaders in the development of bioenergy, green and hybrid chemistry for the 21st century.

Developing a consensus on biomass development

Energy conservation coupled with solar, wind, geothermal and bioenergy can all make important contributions to meeting our energy needs and lessening dependence on fossil fuels.

The transition from a fossil fuel-based economy to a renewable energy-based economy will neither be easy nor rapid. But everything possible needs to be done to facilitate and speed up the process. That requires agreement and cooperation. Unproductive confrontation between groups with differing viewpoints must be replaced by a wide consensus on how to move forward—including the public, industry, First Nations, environmental interests, academia and government.

Confronting our dependency

The Canadian Bioenergy Association strongly believes that the responsible use of forest biomass for the production of energy and chemicals can

gradually replace products sourced from fossil fuels and can also provide a net benefit to the environment as well as enormous societal benefits.

A recent study in the United States, entitled “Managing Forests Because Carbon Matters: Integrating Energy, Product and Land Management Policy” states that “energy produced from forest biomass merely returns recently absorbed carbon to the atmosphere, and essentially results in no net release of carbon, provided that overall forest inventories are stable or increasing.”

Nourishing the source

Bioenergy development can move ahead simultaneously with an increase in the quantity and quality of forests. Bioenergy development in Europe has been widely supported by the public because forests have continued to grow and traditional forest values have been preserved. After 100 years of being a carbon sink, Canada's forests have, in recent decades, been oscillating back and forth between

being a carbon sink and a source. This is partly the result of increased wildfires and massive insect kills and downturns in the forest industry. We must pursue policies and practices that ensure our forests remain net absorbers of carbon in the future, and that our forests continue to grow in both quantity and quality, providing a wide range of societal benefits.

Several key points need to be emphasized with respect to forest biomass and the bioenergy industry in Canada:

■ The forest industry is committed to sustainable and responsible forest management within areas designated for allowable harvest by each Province.

■ Biomass harvesting for bioenergy uses only a fraction of total biomass availability in Canada—no large scale extraction is occurring.

■ In most provinces environmental guidelines exist or are under development relating to forest biomass harvesting and the restriction of biomass removal from ecologically sensitive

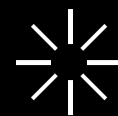
areas.

■ Wood residues should continue to be the primary source of forest biomass. Standing trees are harvested for biomass only when they do not have a “higher-value” market and where replanting can take place that will add value to the overall forest.

Bioenergy is an integral part of the future. The emerging bio-economy is capable of producing bio-chemicals and bio-products that further decrease the overall dependence on oil. What we need is to foster a consensus on the “best practices” for industry development that provide for environmental, economic and societal benefits for our generation and those following. CanBio will act as a catalyst for building such a consensus and invites all those interested to join in the process.

CHRISTOPHER REES

Chair of the Board,
Canadian Bioenergy Association
editorial@mediaplanet.com



WE RECOMMEND



Second life
Why it's vital to recycle molecules.

PAGE 7

“Our reclaimed refrigerants meet or exceed the highest standards and are returned to the market place for the exact same use.”

Harnessing our intellect p. 4
Fostering growth from discovery to market.

Taking to the skies p. 6
How Biofuel is finding a new use in the aviation industry.

**MEDIA
PLANET**

GREEN CHEMISTRY
1ST EDITION, DECEMBER 2011

Responsible for this issue:

Publisher: David Shoemaker
david.shoemaker@mediaplanet.com

Designer: Penelope Graham
penelope.graham@mediaplanet.com

Contributors: Roland Andersson, Cheryl Mayer, Murray McLaughlin, Indrani Nadarajah, Christopher Rees, Rui Resendes, Andrew Seale, Michael Weedon, Green Centre Canada

Photo Credit: All images are from iStock.com unless otherwise accredited.

Managing Director: Gustav Aspegren
gustav.aspegren@mediaplanet.com
Business Developer: Chris Vassallo
chris.vassallo@mediaplanet.com

Distributed within:

National Post, December 2011
This section was created by Mediaplanet and did not involve the National Post or its Editorial Departments.



FOLLOW US ON FACEBOOK AND TWITTER!

www.facebook.com/MediaplanetCA
www.twitter.com/MediaplanetCA

Mediaplanet's business is to create new customers for our advertisers by providing readers with high quality editorial content that motivates them to act.

DON'T MISS!



Biomass: An all encompassing material

Biomass is used to create bioenergy (biofuels and bioelectricity); biobased chemicals; and biocomposites.

To ensure biomass creates businesses the will be long term profitable ventures the businesses need to produce a range of products from biofuels to biobased chemicals. Ethanol is the low end value of production, but moving to biofuels plus chemicals generates increased value and profitability. As we continue to develop the processes to deal with biomass we will see increased products and materials beyond bioenergy.

Biomass is material derived from recently living organisms, which includes plants, animals and their byproducts and includes forestry waste, animal waste, purpose grown crops, corn stover, wheat straw, etc. As the biobased chemistry processes continue to move to commercialization we will see increased profitability and increased partnerships. The partnerships will include the petroleum industry as they look for ways to become greener and move to developing Hybrid chemistry.

Courtesy of Sustainable
Chemistry Alliance