



Connecting Ottawa and Eastern Ontario's Cleantech Community

The Ottawa Cleantech Report

Volume I - Spring 2008



Welcome to the spring 2008 edition of the Ottawa Cleantech Report.

In this edition Janna Glenn, Manager of Marketing and Communications for OCRI, takes a look at the first major event for the Ottawa Cleantech

Initiative in 2008—the Green Building Showcase. This event, like many Ottawa Cleantech Initiative events, was designed to gather various stakeholders in a particular sector who together can help accelerate the use and development of clean technologies in their sector.

In our industry profile we talk to Yves Grandmaitre of Synergy Biopower, a very interesting biopower provider in the region. Of particular interest is how well positioned companies like Synergy are in the region with the ability to access leading research, customers, talent and supplies all within about a 100 km radius.

Also in this edition, we examine research being done by Dr. Handan Tezel of the University of Ottawa in the capture and separation of methane and carbon dioxide from renewable natural gas sources such as landfills for use in the chemical and energy industries.

Finally, we take a closer look at the National Research Council's Industrial Research Assistance Program (NRC-IRAP) and how specifically their programs can make significant contributions to the growth and development of any technology company.

Please continue to contact us with your ideas and feedback or just to let us know what you are doing in the clean technology space and keep checking our website for future updates and events.

Marc McArthur
Manager, Ottawa Cleantech Initiative

Green Building Showcase: A Window to Ottawa and Eastern Ontario's Green Building Capabilities

by Janna Glenn, Manager, Marketing & Communications, OCRI

In March 2008, members of Ottawa and Eastern Ontario's design, building and construction community came together to showcase the area's green building industry. Presented in partnership with the Ottawa Region Chapter of the Canada Green Building Council (ORC CaGBC) and sponsored by the Canadian Wildlife Federation, HOK and Reset Electronics Inc., the Green Building Showcase was designed to connect the community and showcase what is perhaps Ottawa's greenest building—"The Currents."

Built by Windmill Development Group, "The Currents" makes use of many eco-friendly features. While many of us marvel at the "new" smell of our homes and cars, our tour through the building taught us that those smells are actually

toxins escaping from paints, adhesives, caulking, wood, etc. "The Currents" was built with materials that had low or zero toxins and off-gasing. In addition, Windmill focused on the basics of energy efficiency through a high performing envelope and minimizing mechanical systems; the use of high fly ash content in the concrete structure; the use of





recycled and rapidly renewable content; waste diversion strategies; natural lighting; water reclamation and re-use; dual flush toilets; and aerated faucets.

The building was twisted 90 degrees above the Great Canadian Theatre Company (GCTC) to maximize a southwest exposure allowing the front façade of the building to have a passive solar wall added which accounts for approximately five per cent of the heating requirements for the building.

During the event, Jonathan Westeinde, Managing Partner of Windmill Development Group Ltd., gave the keynote address and spoke to the environmental features of the building as well as the process. "Building "The Currents" was a team effort with all consultants working to meet the pre-determined design goals," stated Mr. Westeinde; "the project was a real partnership between Windmill, the City of Ottawa and the surrounding community associations." Westeinde continued by highlighting the consulting team which consisted of Busby Perkins + Wills Architects; AAR Structural Consultants; Stantec Engineering; Ferraro and Associates; and landscape architect Gino Aiello.

"The Currents" is on target to be—at minimum—a LEED Gold project. Jonathan anticipates that it could be Windmill's second LEED Platinum building. If it attains its LEED Platinum target it will be the highest LEED rated mixed use building in North America Windmill achieved the first LEED Platinum multi-residential building on its project "The Vento" in Calgary. He left the audience with the message that much of what was done to achieve this was done through basic conservation-oriented design and while he is proud of "The Currents," he hopes that more builders will adopt green building practices making buildings like "The Currents" the norm instead of unique.

The event also featured a number of suppliers that provide green building products to the industry. Suppliers included:

72 Degrees Heating and Cooling Solutions Inc.—provides geothermal heating and cooling solutions through NextEnergy.

Armstrong Monitoring Corporation—provides programs and services available in most regions to combine workplace safety, regulatory compliance, and energy conservation, with optimum sensing technology.

County of Renfrew—showcased their Forestry Stewardship Council (FSC) certified wood and wood products.

Eastern Ontario Model Forest—works with government, landowners, industry, First Nations and other stakeholders to develop new ways to sustain and manage our forest resources.

Ecoteriors—an Ottawa interior design company that is exclusively eco-conscious showcased solutions for making existing buildings greener.

Ottawa Solar Power—provides photovoltaic and solar thermal heating solutions.

Quantum Murray LLP—provides brownfield remediation services, taking contaminated sites and cleaning them sustainably to prepare for residential buildings such as "The Currents."

RG Integration—provide consulting services to architectural product manufacturers to aid with research and development for environmentally friendlier solutions and provide professional technical support through the integration of world leading manufacturers of superior quality specialty products.

Sustainable Architecture and Building Magazine—reports on the progress of green building in Canada and elsewhere through the publication of case study articles; technical articles on building systems and products; and related information.

The Healthiest Home—provides design consulting services and supplies green building products.

To learn more about Ottawa Cleantech Initiative events visit www.ottawacleantech.com.

Interview with Yves Grandmaitre, Vice President, Sales and Marketing, Powerbase Energy Systems Inc. and Synergy Biopower

Interviewed by Marc McArthur, Manager, Ottawa Cleantech Initiative

MARC: Yves, thank you for agreeing to do this interview with me. Can you start by telling me how long Synergy Biopower has been in existence?

Yves: Synergy is a brand name used by Powerbase Energy Systems Inc. to identify our biogas heat and power system product line. Powerbase has been in business for over ten years designing and marketing control and protection packages for small hydropower plants. Approximately two years ago, we adapted our technology to use biogas as a fuel to generate electricity.

MARC: I understand that this technology is based on anaerobic digestion. Can you tell me a little bit about how an anaerobic digester works?

Yves: An anaerobic digester is a covered vessel that utilizes bacteria present in the organic material to "digest" in an oxygen-free atmosphere. Think of it as an accelerated and sealed composter. In our case, we are utilizing manure from cows, with other organic waste added to the mix to increase the methane output. During the "digestion" process, the carbohydrates present in the manure are broken down by the bacteria, which then release methane, CO₂ and trace amounts of other gases. To further assist the process we keep the "mix" warm from waste heat created by the engine powered by the methane.

MARC: Are there other types of digesters?

Yves: Yes, some utilize oxygen to speed up the process, while other operate at different temperature ranges, either higher or lower, often determined by the type of organic material to be digested.



MARC: What would you say is the main advantage of utilizing an anaerobic digester?

Yves: It converts organic waste into a revenue stream while eradicating many of the pathogens associated with organic waste such as manure.

MARC: Was there a particular point in time or single event that caused anaerobic digesters to become more attractive or viable?

Yves: Probably the single most important event that triggered the renewal of this industry segment was the introduction of the Renewable Standard Offer Contract program in Ontario that pays generators of renewable energy a higher rate than for standard energy sources.

MARC: Was it difficult to get started?

Yves: In Europe, biogas has been used to generate electricity for many years. Powerbase has adapted the technology to North American technical requirements and economic realities. R&D was required as the electrical frequency in Europe (50Hz) lends itself better to a slow burning fuel such as methane. In North America, our 60Hz frequency required engine modifications to allow it to run properly at a higher speed. Part of the payback is the heat recovery and its use for the farmer. Heat capture and circulation systems were designed accordingly and we then developed a fully integrated control and protection controller to manage the whole container and ancillary devices.

MARC: In what other ways do Synergy Biopower systems differ from other anaerobic digesters in Canada? The world?

Yves: European biogas technology is too expensive for most North American applications. Powerbase has designed the Synergy System to be a fully automated, state-of-the-art turnkey power station with remote 24-7 monitoring and control functionality. We provide a cost effective solution providing a reasonable economic return and a performance guarantee to the client.

MARC: Was it difficult developing this technology here in Eastern Ontario?

Yves: Powerbase has power generation and control expertise acquired over the past ten years that was crucial to the development of the Synergy System.

MARC: Has finding qualified talent ever been an issue for Synergy Biopower?

Yves: We have faced some hiring challenges as our systems deal in many technical fields, seldom seen under one roof. We have had to hire the best skills available but primarily with a strong learning aptitude, and show them the rest.

MARC: Were any partners involved from within the region?

Yves: Yes, including some farmers for pilot sites, Natural Resources Canada, OMAFRA and others were quite helpful.

MARC: How would you describe your market?

Yves: Any client with the raw "fuel" organic material that can generate electricity economically and has a local need for heat is a potential client for the Powerbase Synergy System. Our initial target is the farmer milking a minimum of 75 dairy cows. We will eventually generate electricity from methane derived from other agricultural manures, landfill sites and municipal effluent treatment plants.

MARC: What are the most common difficulties encountered in setting one of these systems up?

Yves: The electrical grid connection approval process is the main regulatory hurdle. The

process can take six months or more to complete. The regulatory authorities are trying to accelerate the process. Powerbase has developed a gated procedure that takes into account all of the required steps to evaluate the potential, estimate costs and obtain the necessary approvals on behalf of the client. In addition, the ability of the local electrical grid to add additional generation capacity can be an issue.

MARC: What would you say are the advantages of having your business in Eastern Ontario?

Yves: The number of interested dairy farmers is phenomenal! Access to NRCan and the farming community has worked out well for us.

MARC: You mentioned this before but has access to universities been useful?

Yves: The Alfred College has been a benefit to the biogas industry.

MARC: Finally, what would you say is the potential for this sector? What is in store for Synergy Biopower in the upcoming year?

Yves: We are commissioning several projects this year and are already booking orders for installation in 2009. The interest and potential for the Synergy System is enormous. There are thousands of farms in Ontario that could use this technology to provide a significant secondary revenue stream. If we capture only a small percentage of this market, we will be busy for years to come. The potential for replication in other markets is significant. Powerbase also sees the potential for partnerships with much larger entities in the agricultural sector.

A Sustainable Energy Source: Production of Natural Gas from Landfill

Municipal landfills produce methane and carbon dioxide gases. These gases need to be separated for two reasons:

The first reason is greenhouse gas reduction. Since carbon dioxide is a greenhouse gas and methane has 21 times the greenhouse gas effect as carbon dioxide, technologies and techniques to reduce the emission of these gases into the atmosphere are of interest.

The second reason is economics. By developing a technology to recover both pure carbon dioxide and pure methane from the landfill gas streams, the methane could be dispensed directly into the natural gas pipelines.



Photo credit: David Taylor, 2008

Dr. F. Handan Tezel, Professor, Department of Chemical and Biological Engineering, University of Ottawa

Pure carbon dioxide could be obtained for commercial use, enhanced oil recovery or sequestration.

An optimal process, with low capital and operating cost, needs to be identified to recover both carbon dioxide and methane from these renewable gas sources.

Dr. F. Handan Tezel, a Professor in the Department of Chemical and Biological Engineering at the University of Ottawa, in collaboration with two companies (Air Products and Chemicals, Inc, and Alcan Specialty Aluminas), is studying the separation and recovery of these gases from landfill gas. She is looking at different highly porous adsorbent materials to be developed/produced by Alcan Specialty Aluminas. Those materials will be used in an adsorption-separation and recovery process called Pressure Swing Adsorption (PSA) that will be built by Air Products and Chemicals, Inc.

The PSA process consists of at least two columns packed with the porous adsorbent material and works in two steps. In the first step,

column one adsorbs (traps) carbon dioxide gas and lets methane go through as a product until it gets saturated. This is called the "Adsorption" step for this column. In the second step, this column is regenerated by lowering the pressure and recovering the carbon dioxide. This step allows column one to be ready to adsorb carbon dioxide again and is called the "Regeneration" step. While regeneration is taking place for column one, column two goes through an adsorption step, and while adsorption is taking place for column one, column two goes through a regeneration step. These two steps are repeated over and over again for both columns to have continuous feed and product streams.

The project involves the design of the best adsorbent material for this process, as well as the optimization of the operating conditions. The results obtained from this project will be used to provide high-purity methane and carbon dioxide. These kinds of projects are truly win-win, providing both a positive economic return and a reduction in greenhouse gases. Good for our society to be much more sustainable!

The NRC Industrial Research Assistance Program (NRC-IRAP)

The NRC Industrial Research Assistance Program (NRC-IRAP) provides a range of both technical and business oriented advisory services along with potential financial support to growth-oriented Canadian small and medium enterprises. The program is delivered by an extensive integrated network of 230 professionals in 100 communities across the country. Working directly with clients, NRC-IRAP supports innovative research and development, and commercialization of new products and services.

NRC-IRAP views SMEs as the strategic backbone of the Canadian economy and is committed to working with them while they realize their full potential, and turn knowledge and innovation into strategic opportunities, jobs and prosperity for all Canadians.

Recognized globally for research and innovation, NRC is a leader in the development of an innovative, knowledge-based economy for Canada through science and technology.

How IRAP can help

The NRC-IRAP portfolio of services has four main components:

- Advisory technical and business services provided by ITAs and Business Advisors
- Financial Assistance for R&D Activities
- Networking Opportunities
- Partnerships and Collaboration

Technology Expertise and Advisory Services

NRC-IRAP provides specific technology and business expertise and advisory services through its integrated network of professionals whose specialties encompass many technology sectors. Their skills in science and technology, as well as their hands-on experience in business, allow Industrial Technology Advisors (ITAs) and Business Analysts (BAs) to provide customized solutions to clients.

In order to increase the network, reach and reciprocal exposure to ITAs and the business

they aim to serve, IRAP has been able to work closely and often in-house with associations and organizations across Canada such as OCRI (Ottawa Centre for Research and Innovation), who currently has one ITA in-house, to establish long-term, mutually beneficial arrangements.

Financial Assistance for R&D Activities

NRC-IRAP offers two kinds of financial assistance:

Research and Technology Development Activities

NRC-IRAP makes funding contributions to Canadian SMEs interested in using technology to commercialize services, products and processes for Canadian and international markets. NRC-IRAP can also provide non-repayable financial assistance, on a cost shared basis, to companies whose R&D activities have the objective of significantly increasing the sales and/or employment of the firm. In addition, NRC-IRAP provides financial support indirectly through contributions to regional and national partner organizations that supply business, technical and research assistance to Canadian SMEs.

Youth Employment Strategy Programs - On behalf of YES — the Government of Canada's Youth Employment Strategy program funded by the Department of Human Resources and Social Development Canada (HRSDC) — NRC-IRAP delivers two initiatives that enable SMEs to hire recent postsecondary graduates with the specific skills and expertise needed to advance innovative projects:

- Internship Program with Innovative Small and Medium Enterprises
- Collaborative Research Internship Program

Both firms and graduates benefit from these programs: firms can make use of up-to-date, specialized expertise in a wide variety of disciplines, and graduates gain valuable first-hand practical experience from working with innovative entrepreneurs. Internships last from six to twelve months and are available anywhere in Canada.

Networking Opportunities

NRC-IRAP networks play a critical role in bringing together the key players in the Canadian innovation system for the economic

and technical benefit of SMEs. Through these extensive networks, ITAs can link SMEs to industrial experts, technology brokers, technology transfer centres, and research and development institutes such as NRC, other government laboratories, and universities/colleges across Canada.

NRC-IRAP networks extend past Canada's borders, with international connections forged by technology missions, linkages and collaboration with science and technology advisers via International Trade Canada's (ITCan) locations around the world.

Partnerships and Collaboration

Through strong partner relationships with organizations at regional, national and international levels, the program provides access to a broad range of services to its clients.

Linking more than 100 partner organizations, NRC-IRAP taps into the full power of Canada's innovation opportunities benefiting many of Canada's SMEs. The program's relationships with universities and other educational institutions promote the transfer of knowledge and research over to the industrial sector.

NRC-IRAP has also taken a collaborative approach in building upon community innovation over the past decade. Increasingly, innovation is taking the form of community-based "technology clusters" - a concentration of innovative companies around a nucleus of research and development facilities. In recent years, NRC's research institutes have become central hubs for dynamic technology clusters from coast to coast, and NRC-IRAP fully utilizes these collaborative relationships to provide additional services to SMEs.

General Inquiries

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Industry News

Next Generation of Jobs Fund

The Next Generation of Jobs Fund is a five-year, \$1.15 billion strategy to help innovative companies grow and create well-paying sustainable jobs for today's workforce and for the next generation of Ontario's highly skilled workers. The world needs green products, efficient technologies, health cures and treatments. Ontario has strengths in these areas. We can create these jobs here and the Next Generation of Jobs Fund will help to do this. [Full Story](#)

April 11, 2008

Turning River Currents Into Clean Electricity : McGuinty Government Investing To Spark Green Technology

A green energy project using innovative water turbines will generate renewable power from the current of the St Lawrence River. The Ontario Government-funded project, located near Cornwall, will turn the river's strong current into 15 megawatts of clean energy, enough to power 11,000 average-sized homes. [Full Story](#)

April 9, 2008

Harnessing Biology, and Avoiding Oil, for Chemical Goods

By Yudhijit Bhattacharjee,
New York Times

The next time you stop at a gas station, wincing at the \$3.50-a-gallon price and bemoaning society's dependence on petroleum, take a step back and look inside your car. [Full Story](#)

April 1, 2008

Demands for crackdown on biofuels scam: US 'splash and dash' loophole undermines climate change fight

Terry Macalister, The Guardian
The EU is being urged to take action to stop a biofuel trading scam that exploits US agricultural subsidies and undermines the fight against global warming. [Full Story](#)

The BioWorld Biofuels Report 2008: Economics of a Driven Market

Insight into the history, statistics and forecasts of the emerging biofuels market for 2008. [Full Story](#)

GOVERNMENT OF CANADA GIVES \$3.9 MILLION BOOST TO BIOFUELS IN ONTARIO: ecoAgriculture Biofuels Capital Initiative (ecoABC)

The ecoABC Initiative is a federal \$200 million four-year program ending on March 31, 2011 that provides repayable contributions for the construction or expansion of transportation biofuel production facilities. Funding is conditional upon agricultural producer investment in the biofuel projects, and the use of agricultural feedstock to produce the biofuel. [Full Story](#)

March 26, 2008

Precarn offers \$2.1M boost for clean tech, manufacturing

By Ottawa Business Journal Staff
The Ottawa-based not-for-profit said it is asking companies to respond to a request for proposals for the development or implementation of intelligent systems technologies in areas related to clean tech or manufacturing, particularly automotive parts. [Full Story](#)

March 24, 2008

Where the Money Is: Why venture capitalist John Doerr is bullish on green investments

Silicon Valley's venture capitalists have embraced green technology in a big way, pouring money into companies developing alternative fuels, fuel-efficient devices and other "clean" technologies. One of the most influential venture firms, Kleiner Perkins Caufield & Byers, is devoting about one-third of its investments to green technology. [Full Story](#)

The Future Ain't What Is Used to Be by Ron Pernick

Anyone still not convinced about the economic strength and viability of clean energy need look no further than the latest numbers in our annual Clean Energy Trends 2008 report. Against the backdrop of a contracting economy, record-high oil prices, rising home foreclosures, and consumer uncertainty, clean-energy markets grew by 40 per cent from \$55 billion in 2006 to \$77.3 billion in 2007. We project that these same technologies will reach \$254.5 billion by 2017. [Full Story](#)

January 8, 2008

China's Laws Are Stifling Biotechnology Research, Study Finds

China is stifling biotechnology research with regulations that deter foreign companies from investing in an industry that grew 30 per cent a year from 2000 to 2005, a new study found. [Full Story](#)

January 4, 2008

Garbage crisis looms

Jake Rupert, Ottawa Citizen
As the City of Ottawa's landfills rapidly run out of space, 2008 will be a pivotal year for averting a trash-disposal crisis. [Full Story](#)

January 3, 2008

Alternative Fuels to relocate from NY to PA; Pennsylvania to provide \$1 million grant to idled biodiesel producer

In New York, Alternative Fuels put its biodiesel plant in Binghamton up for sale and announced that it will relocate to Pennsylvania. The company will receive a grant of \$1 million from the Keystone State towards production of algae-based biodiesel. The company ceased production in November, citing high operational costs in New York and high feedstock prices. The 3.5 Mgy plant used soybean oil as a feedstock. [Full Story](#)