

## **IEA Task 37 – Energy from Biogas and Landfill gas Country Report – Canada, April, 2010**

### **1) Any new policy/program announcements in the biogas area**

#### **Current Canadian Policy – Federal and Provincial**

##### *Standards Council of Canada*

Current opportunity to participate in national and international committee work:

Proposal for a new field of technical activity on Biogas

The Standards Council of Canada (SCC) is seeking feedback on the development of a new field of technical activity on Biogas submitted by the Standardization Administration of China (SAC) to the International Organization for Standardization (ISO). Biogas is a combustible mixture of gases produced by micro-organisms when manure and other biological wastes are allowed to ferment in the absence of air. Biogas can become an important source of fuel. As there are no international standards in this field, the purpose of this new technical activity would be to develop standards and promote their use by industry and individuals in both developed and developing countries.

#### **Provincial Government Support for Biogas**

##### **Ontario**

##### *Standard Offer Program - Renewable Energy Standard Offer Program*

The Standard Offer Program helps Ontario meet its renewable energy supply targets by providing small electricity generators a standard pricing regime and a streamlined process. As of October 1, 2009 RESOP has been replaced by the Feed-in Tariff Program (FIT Program).

##### *Clean Energy Standard Offer Program*

The Clean Energy Standard Offer Program (CESOP) will support small clean energy generators. The Program is intended to encourage participation by a variety of clean energy technologies, including natural gas-fired Combined Heat & Power (CHP), by-product fuel-fired generation projects, and generation projects fuelled by under-utilized energy (thermal or mechanical) sources.

##### *Ontario Biogas Systems Financial Assistance (OBSFA) Program*

In 2007 the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) launched the \$12.4-million Ontario Biogas Systems Financial Assistance (OBSFA) Program to provide assistance to farmers and rural businesses to conduct feasibility studies for the installation of biogas systems as well as cover a portion of construction costs for biogas plants.

##### *Feed-in-Tariff (FIT) Program*

On September 30th, 2009 the OPA launched the Feed-in-Tariff (FIT) Program offering guaranteed pricing for renewable electricity production. The FIT pricing for on-farm electricity production, includes:

19.5¢/kWh for a plant size ≤ 100 kW, 18.5¢/kWh for a plant size > 100kW ≤ 250 kW and 16¢/kWh for a plant size ≤ 500 kW (OPA, 2009).

##### *Community Power Fund*

The Community Power Fund is interested in supporting community biogas projects. Applicants must be members of OSEA. Information on criteria and means of being a member is available from contacts listed below.

## 2) Estimated Biogas Production in Canada

**Taken from BBI Biofuels presentation** (Bradley A Saville (University of Toronto) and Brian Duff (BBI International) report/presentation co-authors):

“We note that Ontario contains about 40% of the total Canadian biogas potential - about 320 megawatts. Alberta and BC also have significant contributions to this total at just under 100 megawatts of anaerobic digestion potential in those jurisdictions. Quebec is also notable at about 70 megawatts and then we have smaller amounts distributed across the other provinces. Total Solids from quality Food waste streams and recycled organics a total estimated biogas potential in Canada potential is now over 1500 megawatts and again Ontario represents the largest fraction of this at a little over 800 megawatts. Alberta and British Columbia also have significant contributions to the biogas potential at more than 150 megawatts each and Quebec has over 100 megawatts of biogas potential. “

“Looking at biogas potential from manure, we looked at the livestock profiles within each province and then assumed manure recovery ratios for each of the different types of animals. We considered a 70% recovery for dairy cattle 50% recovery for beef cattle and 80% from hogs. The higher recovery for the dairy cattle and hogs is consistent with the fact that they spend more time within barns and the manure is more easily recovered. The biogas yield is 360 m<sup>3</sup> per tonne of volatile solids converted and the manure is assumed to have an average volatile solids content of 3.3%. On this basis the total biogas potential is just under 126 billion m<sup>3</sup> within Canada on an annual basis. A large portion of this is based in Alberta with over 43 million m<sup>3</sup>.”

“In conclusion we have established that there is significant **potential** for biogas in Canada. 125 million m<sup>3</sup> of biogas from manure, 0.9 to 2 billion m<sup>3</sup> from food and organic waste and a lot of that food and organic waste potential is within Ontario.”

## 3) Present AD Activities in Canada

There are currently 17 farm digesters operating in Canada, with 7 in Ontario (Desjardins, 2009) and 5 in Alberta alone. With the implementation of the OBSFA program and the new Feed-in Tariff pricing, 14 new biogas plants have been approved for construction on Ontario farms in the next 2 to 3 years (OMAFRA, 2009a).

Approximately 20 biogas projects are in various stages of development in Alberta. It is estimated that by 2012 there will be approximately 25 farm digesters operating in Ontario (Duke, 2009), all of which will be involved in co-digestion.

An example of a current project funded through the [Clean Energy Fund Renewable Energy and Clean Energy Systems Demonstration Projects](#) would be:

*Food and Yard Waste Anaerobic Digestion to Electricity Demonstration*

*Lead proponent: Harvest Power Canada Ltd.*

Location: Fraser Richmond Soil and Fibre, British Columbia

Purpose: This project would be Canada's first high-efficiency system for producing up to 1 MW of renewable energy from food and yard waste. If successful, this technology has the potential to be rapidly deployed across Canada as a mechanism to divert food wastes from landfills and produce renewable energy.

*StormFisher Biogas*

Cambridge, Ontario

A \$20 million energy-from-waste plant is proposed near the Toyota car factory in north Cambridge.

StormFisher Biogas of Toronto says the facility will use waste agricultural material from farms across

Oxford, Perth and Wellington counties, along with food processing plants in the city. The material would

be put into digesters, producing methane gas to produce electricity and solid material to be sold as fertilizer.

### Current Biogas Facilities in Ontario (Taken from the [OMAFRA](#) Web site)

#### Phase 2 Projects - Biogas System Construction and Implementation

Phase 2 provides up to 40 per cent of construction, implementation, and commissioning costs for biogas systems. The maximum total available Phase 2 funding is up to \$400,000 for each biogas system minus any Phase 1 funding they received.

Phase 2 Projects - Biogas System Construction and Implementation (Central Ontario)		
Business Name	County/District	General Project Information
Bayview Greenhouses (Jordan Station) Inc.	Niagara	Greenhouse, electricity production and thermal energy
Vandermeer Greenhouses	Niagara	Greenhouse, electricity production and thermal energy
Maryland Farms	Kawartha Lakes	Dairy, electricity production and thermal energy – <b>Not completed and operating yet</b> – part of FIT projects – using 1,500 m3 CH-Four Biogas, Inc. AD

Phase 2 Projects - Biogas System Construction and Implementation (Eastern Ontario)		
Business Name	County/District	General Project Information
Pinehedge Farms Inc.	St. Eugene	Organic dairy farm and yoghurt production, electricity production, and thermal energy- <b>Not completed and operating yet</b>
Terryland Farms Inc.	Prescott & Russell	Dairy farm, electricity production
FEPRO Farms	Renfrew	Dairy farm, electricity production, expanding existing biogas system
Ledgecroft Farms Inc.	Leeds & Grenville	Dairy farm, electricity production
Kirchmeier Farms Inc	Prescott & Russell	Dairy farm, electricity production - <b>Not completed and operating yet</b> – part of FIT projects – using 1,500 m3 CH-Four Biogas, Inc. AD
Petrocorn Inc.	Prescott & Russell	Dairy farm, electricity production - <b>Not completed and operating yet</b> – FIT projects – using 1,500 m3 CH-Four Biogas, Inc. AD
Clearydale Farms	Grenville	Dairy farm, electricity production – <b>Not operating yet</b>
Donnandale Farms Inc.	Hastings	Dairy farm, electricity production – <b>Not operating yet</b>
Schouton Corner View Farms Ltd.	Ottawa/Carlton	Dairy farm, electricity production– <b>Not operating yet</b>
Ferme Geranik Inc.	St. Albert	Dairy farm, electricity production– <b>Not operating yet</b>
De Bruin Farms Ltd.	Frontenac	Dairy farm, electricity production- <b>Not completed and operating yet</b>

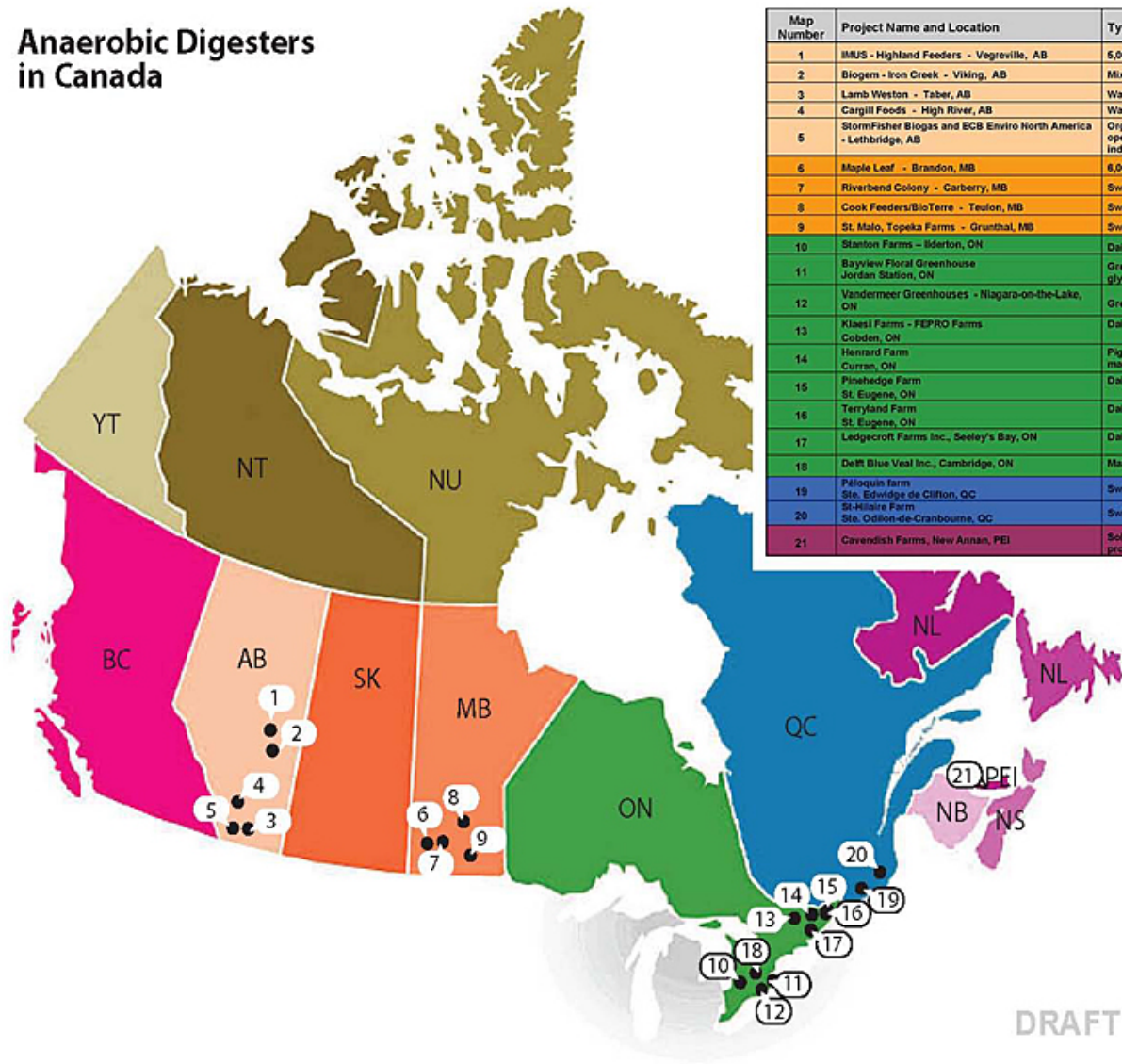
<b>Phase 2 Projects - Biogas System Construction and Implementation (Western Ontario)</b>		
<b>Business Name</b>	<b>County/District</b>	<b>General Project Information</b>
Stanton Bros. Ltd.	Middlesex	Dairy farm, electricity production
Finnie Distributing (1977) Inc.	Perth	Byproduct processor and natural gas replacement
Seacliff Energy Inc.	Leamington	Greenhouse, electricity production and thermal energy – Early 2010
Clovermead Farms Inc.	Wellington	Dairy, veal, and beef farm, electricity production - <b>Not completed and operating yet</b>
Delft Blue Veal Inc.	Hamilton-Wentworth	Veal farm, electricity and thermal energy - 500 kW biogas system (350 kW + 149 kW generators) – Early 2010
Ben Gardiner Farms Inc.	Perth	Beef feedlot, electricity production- <b>Not completed and operating yet</b>
ENS Poultry	Wellington	Beef farm, poultry processing- <b>Not completed and operating yet</b>

#### **Current Biogas Facilities in Alberta**

<b>Company, Location</b>	<b>Feedstock</b>	<b>Purpose</b>
Cargill Foods, High River	meat processing wastes	methane replaces some of the natural gas used to operate facility; odour reduction
Lamb Weston, Taber	potato renderings from potato processing	methane replaces some of the natural gas used to operate facility
Highmark Renewables, Vegreville	feedlot manure	electricity for sale to the grid; energy for operating the facility; manure management; biofertilizer
Iron Creek Hutterite Colony, Viking	various types of livestock manure and slaughterhouse wastes	energy for operating the facility; electricity for sale to the grid; manure management; water conservation; odour reduction
Peace Pork, Falher	hog manure	odour reduction; manure management

Farm Based Biogas in Canada (AD Map)

### Anaerobic Digesters in Canada



Map Number	Project Name and Location	Type of Operation/Feedstock	Energy Production
1	IMUS - Highland Feeders - Vegreville, AB	5,000 head beef, manure and slurry	760 kWe + 975 kWt
2	Biogem - Iron Creek - Viking, AB	Mixed farm waste	350 kWe + 770 kWt
3	Lamb Weston - Taber, AB	Waste-water, potato sludge	Not available
4	Cargill Foods - High River, AB	Waste-water, meat processing wastes	Not available
5	StormFisher Biogas and ECB Enviro North America - Lethbridge, AB	Organic byproducts from local livestock operations, meat and food processing industries, restaurants and schools.	3.2 megawatt
6	Maple Leaf - Brandon, MB	6,000 hog finishing barn	Not available
7	Riverbend Colony - Carberry, MB	Swine manure	Not available
8	Cook Feeders/BioTerre - Teulon, MB	Swine manure	Not available
9	St. Malo, Topeka Farms - Grunthal, MB	Swine manure, silage	Not available
10	Stanton Farms - Iderton, ON	Dairy manure	375 kW
11	Bayview Floral Greenhouse Jordan Station, ON	Greenhouse by-products, grain, glycerin, corn and animal feed	250 kW
12	Vandermeer Greenhouses - Niagara-on-the-Lake, ON	Greenhouse by-products	GE Jenbacher engine- 335 kW electrical and 402 kW thermal
13	Klaesi Farms - FEPRO Farms Cobden, ON	Dairy manure, off-farm material	500kW
14	Henard Farm Curran, ON	Pig manure, whole stillage, off-farm material	2 X 633 kW
15	Pinnehedge Farm St. Eugene, ON	Dairy manure, off-farm material planned	100 kW
16	Terryland Farm St. Eugene, ON	Dairy manure, off-farm material	180 kW
17	Ledecroft Farms Inc., Seeley's Bay, ON	Dairy manure, off-farm material	500 kW Jenbacher biogas engine-generator set
18	DeR Blue Veal Inc., Cambridge, ON	Manure, fats/oils/grease	500 kW biogas system
19	Patoquin farm Ste. Edwidge de Clifton, QC	Swine manure	Not available
20	St-Hilaire Farm Ste. Odilon-de-Cranbourne, QC	Swine manure	50 kW
21	Cavendish Farms, New Annan, PEI	Solid waste material from potato processing	Not available

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#### 4) Any new plants/projects funded in the biogas/AD area

##### **Ontario**

Ontario Power Authority FIT (Feed-in Tariff) Program in Ontario has new projects with an overall of (see below table):

Biogas - 6 projects with a total of 12,655 kW potential

Landfill Gas - 4 projects with a total of 14,500 kW potential

Biomass - 2 projects with a total of 18,587 kW potential

Applicant Legal Name	Project Name	Project City	Project Source	Capacity (kW)
Clearydale Farms	Clearydale Farms	Spencerville	Bio-Gas	498
De Bruin Farms Ltd.	DeBruin Farms Biogas	Wolfe Island	Bio-Gas	360
Ferme Geranik Inc	Ferme Geranik Biogas	St. Albert	Bio-Gas	499
Gillette Farms Inc.	Powerbase/Gillette Farms Inc	Embrun	Bio-Gas	498
Grimsby Energy Inc	Grimsby Bioreactor project	Grimsby	Bio-Gas	1000
purEnergy	Kawartha Biogas	Havelock	Bio-Gas	9800
Integrated Gas Recovery Services Inc	Lafleche Landfill Gas Utilization	Moose Creek	Landfill	4500
North Bay Hydro Distribution Ltd	Merrick Landfill Project	North Bay	Landfill	1600
Peterborough Utilities Inc	Bensfort Rd LFG Generation Project	Peterborough	Landfill	2000
Waste Management of Canada Corporation	WM Ottawa Landfill Gas to Energy	Ottawa	Landfill	6400
Haliburton Forest & Wild Life Reserve Ltd	Haliburton Forest Biopower 1	Haliburton	Biomass	775
Index Energy Mills Rd Corporation	Index Energy Mills Rd Corporation	Ajax	Biomass	17812

##### **Maritime Provinces**

###### *Cavendish Farms, Prince Edward Island*

Krieg & Fischer/Stantec design engineer

Bio-Gas Facility - June 2009

The new facility will convert the solid waste material from potato processing into energy through anaerobic digestion.

###### *Laforge Bioenvironmental – January 2010*

A dairy farm in St. André, New Brunswick will use dairy manure and waste from the McCain Foods plant in Grand Falls to start producing enough electricity to power 200 homes a year. The biogas system is being built by Laforge. The \$2.35-million project received nearly \$904,000 from the New Brunswick Climate Action Fund.

##### **Quebec**

Four green projects have been identified as priorities and will receive federal investment of up to \$150M under the Green Infrastructure Fund of Canada's Economic Action Plan. The Government of Quebec has also allocated a financial contribution around \$165M for these projects under its own Green Fund.

The four projects involve the treatment of a large part of the organic waste generated in the city of Montreal and its municipal cities, Laval, Longueuil and south Montreal.

The goal of the projects is to establish anaerobic digestion (biomethanation) and composting facilities, more specifically utilizing the treatment of table scraps, septic sludge and organic waste from homes, factories and institutions.

The Montreal project, which is to receive a contribution of \$67M from the Government and \$68.5 from the Government of Quebec, will construct two systems to treat organic waste through anaerobic digestion, two composting centres and a pilot centre for the pre-treatment of organic waste.

### ***Prairie Provinces***

#### *Manitoba Hydro*

Manitoba Hydro will have 5 new demonstration projects at various locations throughout Manitoba in 2010. These demonstration projects also recently qualified for funding through the Government of Canada's Clean Energy Fund.

#### *Sweetridge Farms, Winkler, Manitoba*

One of the 5 demonstration projects, this one will utilize the anaerobic digestion of wet biomass. Through the use of specialized equipment, livestock manure is digested and converted into a treated effluent and biogas.

#### *Saskatchewan - Prairie Agricultural Machinery Institute (PAMI) – May 2009*

The Government of Canada is investing \$350,000 so that PAMI can develop a pilot-scale, solids-content anaerobic digester. PAMI is to construct a pilot scale solids-content anaerobic digester which determine the cost-effectiveness of converting waste to clean energy.

### ***Alberta***

#### *Vegreville-Wainwright, Alberta*

Growing Power Hairy Hill Limited Partnership to expand its biogas facility

Expansion of the existing demonstration-scale biogas plant represents the first phase in developing a larger integrated bio-refinery capable of producing products such as green power, bio-fertilizer and fuel ethanol. The project includes the construction of new biogas capacity, the commercialization of technology and installation of equipment to convert animal waste to methane, which will in turn be used to fuel two generators for producing electricity.

A repayable federal investment of \$4,143,000 is being provided through the Community Adjustment Fund (CAF) as part of Canada's Economic Action Plan.

#### *Lethbridge, Alberta*

##### *Biogas/ Cogeneration Project*

ECB & StormFisher have partnered to build a 3.2MW biogas facility in Lethbridge. On top of producing green, renewable electricity, the facility will provide a safe & sustainable disposal alternative to the agricultural & food processing industries, by processing up to 150,000t of livestock manure, food processing waste & animal by-products annually. Lastly, the facility's throughput will be dried & pelletized & sold to the agricultural & commercial organic fertilizer markets.

High River, Alberta

EcoAg Initiatives was recently approved to build a biogas generation facility in the area and some people are concerned. A new facility in the Tongue Creek area west of High River has some residents up in arms.

### **British Columbia**

*UBC Point Grey Campus - Nexterra Systems Corp.*

Demonstration of Heat and Power from Biomass Gasification

UBC Point Grey Campus, Vancouver, British Columbia

Project will showcase biomass gasification integrated with an internal combustion engine generator in a novel, small-scale combined heat and power demonstration suited for on-site applications at public institutions, industrial facilities, and northern and remote Canadian communities. The project has the potential to overcome the difficulty of gas clean up and opens up the possibility of significant replication in Canada and overseas.

*Nata Farms, Armstrong, BC*

Anticipated Commissioning - January 2011

Technology Supplier - ReNew Energy, partnering with Quadrogen Power Systems Inc.

Digester type: Thermophilic digester

Feedstock: Manure from cattle and brewery waste

## **5) Any new reports in the biogas area that can be distributed / accessed**

### **Industrial and Agricultural Anaerobic Digestion Potential in Canada**

BBI Biofuels Canada – 2008 (Online Presentation with Audio)

[http://chem-eng.utoronto.ca/~saville/Slides/Anaerobic\\_Digestion\\_NRCan.WMV](http://chem-eng.utoronto.ca/~saville/Slides/Anaerobic_Digestion_NRCan.WMV)

### **CanBio**

Canada Report on Bioenergy 2009

<http://www.canbio.ca/documents/publications/canadacountryreport2009.pdf>

### **Methane to Markets Partnership Landfill Subcommittee Country-Specific Profile and Strategic Plan for Canada**

[http://www.methanetomarkets.org/documents/landfills\\_cap\\_canada.pdf](http://www.methanetomarkets.org/documents/landfills_cap_canada.pdf)

Useful Bio Web site: <http://www.thebioenergysite.com/index.php>

## **6) Any planned meetings in the biogas area that may be of interest**

### **Growing the Margins Annual Canadian Farm and Food Biogas Conference and Exhibition**

<http://www.gtmconference.ca/site/>