



GLOBAL TRENDS

Renewable Energy - Anaerobic Bio-digesters – 2009/06

Anaerobic digestion is a natural biological process in which microorganisms break down organic matter into methane in the absence of oxygen. A properly operated anaerobic digester will efficiently convert the organic matter into a nutrient-rich, semi-liquid mixture (slurry) and a biogas that is roughly 65% methane. This biogas can be captured and undergo combustion to produce heat and electricity. (Integration of Renewable Energy on Farms)

Currently, biomass contributes approximately one percent of Alberta's electricity generation. A report prepared by the Pembina Institute published in February 2008, suggests that biomass could contribute between four and six percent of Alberta's electricity by 2028.

Alberta has several bio-digesters in operation. Two operations (Iron Creek Hutterite Colony and Peace Pork) use hog manure as the primary feedstock. A beef processing facility (Cargill) uses beef renderings to produce natural gas for its plant operations.

Highmark Renewables – An Alberta Story

Highmark Renewables is an Alberta story that has generated a lot of attention. Their client, Growing Power Hairy Hill, recently announced a \$100 million bio-energy expansion and captured the cover story of the January/February 2009 issue of Manure Manager. They were also featured in the Edmonton Journal on February 11. This expansion will increase the ability of a very large anaerobic digestion plant to process cattle manure from one of Canada's largest feedlots from its current twenty percent to more than eighty percent.

The expansion will also include adding an ethanol plant which will use energy produced by the bio-digester. Meanwhile grain byproducts used as inputs for the ethanol plant will be fed to the cattle.

The Integrated BioRefinery model uses Highmark Renewables technologies, making for an environmental success story by using low-grade wheat already grown for feed, so no additional land needs to be used. Only the starch will be removed for the ethanol production and the remainder will be used as feed. The animal waste will then be used to provide the power for the ethanol plant.

A distinguishing characteristic of the Highmark technology (Integrated Manure Utilization System “IMUS” and “GPAD”, the Growing Power Anaerobic Digestion System) is that it addresses the challenges in processing high solids, high fibre, organic wastes from outdoor feedlots. Existing technologies could not handle waste from outdoor feedlots, which contains large amounts of straw, gravel and dirt. The Highmark design is suitable to handle materials such as food processing wastes and municipal solid wastes.

Highmark Renewables is now prepared to capitalize on international opportunities for their technology and expertise. Having addressed the challenges posed by using manure from feedlots, they are able to tailor their system to address many different feedstocks.

Alberta’s Ethanol Needs

Alberta’s provincial energy strategy requires that a five percent ethanol content for gasoline sold in Alberta by 2010. Alberta will need about 265 million litres of ethanol annually. Currently, Permolex, produces 40 million liters per year in its Red Deer plant. Permolex Ltd. is a grain processing facility that also produces ethanol and other bio-fuel products from multiple feedstocks.



For more information on Anaerobic Digesters

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex11290](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex11290)

Ontario Ministry of Agriculture, Food and Rural Affairs:

<http://www.omafra.gov.on.ca/english/engineer/facts/07-057.htm>

Sources:

Kryzanowski, Tony, “\$100 million invested in bio-energy expansion and ethanol plant,” Manure Manager, January-February 2009.

<http://www.manuremanager.com/content/view/2036/138/>

Nickel, Trevor, Highmark Renewables, June 2009.

<http://www.highmark.ca/>

Peters, Roger and Weis, Tim. “Feeding the Grid Renewably – Using Feed-in Tariffs to Capitalize on Renewable Energy, Pembina Institute, February 2008.

Pratt, Sheila, “Cattle Manure and Alberta Ingenuity are Combining to Produce a Fledgling Alternative Energy Economy, Edmonton Journal, February 11, 2009.

Richards, Harley, “Ethanol Plant Looks to Grow,” Red Deer Advocate, April 9, 2009.

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