

Considerations and Opportunities for Building a Farm-Based Anaerobic Digester System in Ontario

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Infosheet

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INTRODUCTION

Anaerobic digester (AD) systems produce electricity and heat from the biogas produced from organic inputs. Farm-based AD systems represent a significant opportunity for farmers to capture new value from agricultural product and byproducts, and from some off-farm organic inputs. As farm-based green energy becomes a new on-farm product, more and more farmers will be looking at ways to finance and build AD systems.

This InfoSheet presents some key opportunities and issues currently identified by the authors. It is based on the information obtained at the time of writing. Since this an evolving sector with frequent new developments, it is necessary to ensure that all issues involved in building a farm-based AD system be fully explored.

To obtain more current information on any of the programs listed in the InfoSheet, directly contact the provider of the program. This contact information has been included with the description of each program. Another important source is the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Publication No. 07-015 *Programs and Services for Ontario Farmers*
www.omafra.gov.on.ca/english/busdev/facts/07-021.htm

FUNDING PROGRAMS FOR PLANNING AN ON-FARM AD PROJECT

Canadian Farm Business Advisory Service

The Canadian Farm Business Advisory Service, a partnership between Agriculture and AgriFood Canada and OMAFRA, offers a Specialized Business Planning Service for farmers who are diversifying their business operations. This fund pays up to half the cost of hiring a business planning expert to assess the

financial viability of a proposed project and to assist in preparing the business plan. Farm-based projects, with a farm family as one of the investors/owners, are eligible. Non-farmers can be part of a project but only the farmer can qualify for the 50 per cent funding on business planning services.

Eligible farmers can receive up to a 50 per cent refund, to a maximum of \$8,000 assistance per individual farmer and a maximum refund of \$25,000 for a group of four or more farmers.

For more details, contact:

Canadian Farm Business Advisory Services,
1-866-452-5558, www.agr.gc.ca/renewal.

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.

Small grants will be up to \$50,000 and will cover two categories of projects: 1) Pre-feasibility, open to projects that require resources to undertake a part of or a whole feasibility study for a local renewable energy project. 2) Strategic Opportunities open to projects that are beyond the pre-feasibility stage but who may have encountered a hurdle, barrier or opportunity requiring immediate attention and funding.

Large grants, up to a maximum of \$300,000 (over one to three years depending on the project proposal), will be available to projects that have made sufficient progress to date, and can prove a relatively clear path ahead, such that their project will be installed and commissioned by the end of 2010 at the latest.

Both grant programs will only cover soft costs associated with project development, organizational development,

training, community engagement and membership development.

For more details contact Meghan MacLennan (meghan@cpfund.ca) or 416-977-3154, Deborah Doncaster (deb@cpfund.ca) or 416-977-3154, or the web site www.cpfund.ca (available mid September 2007)

CAPITAL FUNDING FOR BIOGAS SYSTEMS

Ontario Biogas Systems Financial Assistance Program

On July 26, 2007, the Government of Ontario announced the Ontario Biogas Systems Financial Assistance Program. This \$9 million initiative is designed to encourage biogas development, resulting in reductions in greenhouse gas emissions and an increase in renewable energy production.

Interested agricultural and agri-food operations may apply for funding to conduct feasibility and design work for biogas systems, for 70 per cent of eligible costs up to a maximum of \$35,000. There is also funding available for 40 per cent of eligible costs of construction of the biogas system. The maximum total feasibility and construction cost funding is up to \$400,000 for each biogas system. Funding is on a first-come, first-served basis for qualifying projects.

More detailed information is available on the program website at www.ontario.ca/biogas as of September 2007. This information can also be obtained from OMAFRA's Agriculture Information Contact Centre, 1-877-424-1300, or by e-mail: ag.info.omafra@ontario.ca.

Environmental Farm Plan

The Canada-Ontario Environmental Farm Plan (EFP) has environmental cost-share opportunities for Ontario farmers. Manure treatment systems, including anaerobic digesters, may be eligible for a cost share of 30 per cent up to \$30,000. This program may last up to March 31, 2008. There are a number of eligibility criteria, including the need for an up-to-date Environmental Farm Plan that is deemed appropriate.

For more details contact: Ontario Soil and Crop Improvement Association, 1-800-265-9751, www.ontariosoilcrop.org

Northern Ontario Heritage Fund, Northern Energy Program

The Ontario Ministry of Northern Development and Mines' Northern Energy Program supports:

- Renewable energy planning
- Renewable energy capital assistance
- New internal energy generation projects, and
- Energy conservation pilot projects.

It gives a conditional contribution of up to 50 per cent of eligible expenses, to a maximum of \$250,000, to assist businesses in generating energy for their own use while reducing their demand for external energy. An emerging technology program is also available. Applicants for projects must be located in Northern Ontario and must make a cash contribution to the project.

For more details contact: Northern Ontario Heritage Fund, 1-800-461-8329, www.nohfc.com, or e-mail: nohfc.ndm@ontario.ca

Innovative Demonstration Fund

The Ontario Ministry of Research and Innovation's Innovation Demonstration Fund is a four-year, \$24 million program, that will fund new and emerging technologies, products and/or processes that have the potential to respond to societal needs and challenges and which can enhance company growth and economic prosperity. The program will provide financial assistance to successful applicants that do not have ready access to conventional sources of capital for the purpose of pilot demonstration projects.

For more details contact: Innovation Demonstration Fund, 416-326-9658, www.ontario.ca/mri, or e-mail: idf@mri.gov.on.ca

Rural Economic Development Program

OMAFRA's Rural Economic Development (RED) Program invests in projects that support sustainable rural economic development and community partnerships. The priorities for the RED Program are revitalizing communities, improving access to health-care services and increasing opportunities for skills development. The program addresses barriers and promotes the exploration of new technologies and processes for non-traditional uses of agricultural commodities and waste products.

For more details contact: OMFARA RED Program, 1-888-588-4111 or e-mail: red.omafra@ontario.ca

CAPTURING VALUE FOR ENERGY FROM BIOGAS SYSTEMS

Biogas system revenue streams may include selling or replacing existing sources of refined biogas/natural gas, heat, and/or electricity.

Selling Refined Biogas

Farm-based biogas contains approximately 60 per cent methane and 40 per cent carbon dioxide, with small amounts of hydrogen sulfide, moisture and other constituents. Refining biogas (to replace natural gas) requires either on-site or local use for the gas, or the use of the conventional natural gas pipeline system. This process has not yet been demonstrated in Ontario.

Selling or Replacing Heat

Selling heat or replacing existing purchases of fuel for heat is an effective use of the available energy from a biogas system. Biogas can be directly combusted in a boiler, although the boiler must be properly designed to manage the moisture and corrosive elements within the biogas.

Usually farm-based biogas is combusted for electrical production in a conventional internal combustion system (see below), with the engine heat producing the heat source. In an optimally designed internal combustion system, 30-42 per cent of energy is available as electricity and approximately 40 per cent of the energy is available as surplus heat.

Biogas systems produce heat daily, year-round. Unless a heat use can be found that requires on-going heat (such as a food processing system), not all of the heat value can be used. A clear process for selling heat has not yet been developed in Ontario. In Denmark, farm-based biogas systems sell heat in the form of hot water to communities and other farmers.

Selling or Replacing Electricity

In Ontario, a means of obtaining value for the energy from biogas systems is to sell electricity or replace existing electricity purchases. There are a number of options for selling or replacing electricity. The most feasible options are listed below.

1. Net Metering

The Net Metering Program allows an electricity consumer to replace electricity purchased for the farm site with locally generated renewable power. Essentially, the electrical grid is used to “bank” electricity produced by the biogas system to be used at a later time. Any surplus production can

be held on credit for a one-year period.. There may be a difference in returns from net metering if the farm has a “demand meter” instead of a conventional consumption meter.

For more details, contact:
Ministry of Energy, 1-888-688-4636,
www.energy.gov.on.ca

Also, consult the following Hydro One web page for information on net metering:
http://www.hydroonenetworks.com/en/customers/generators/net_metering/

2. Standard Offer Program

The Renewable Energy Standard Offer Program (SOP) gives biogas electricity producers the option to sell or replace power at fixed rates for a period of 20 years. At the time of writing, the value of the power is roughly 11 ¢/ kWh for non-peak periods and 14.52 ¢/kWh for peak periods. There may be financial benefits if power is used by the farmstead at the same time it is generated.

For more details, see OMAFRA Publication *Anaerobic Digestion and the Standard Offer Program* or contact: OPA),
www.powerauthority.on.ca

Federal Power Production Incentive (ecoENERGY grant)

The 2007 Federal Budget announced a 1 ¢/kWh production grant for up to 10 years for eligible renewable power production (such as biomass, solar photovoltaic, wind, etc.). For SOP-funded projects, it is understood that 50 per cent of this will be claimed by the OPA.

For more details, contact:
ecoENERGY Program: 1-877-722-6600, or
e-mail: ecoenergyrp@nrcan.gc.ca
<http://ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm>

TAX INCENTIVES

Provincial Sales Tax Rebate

A sales tax rebate for the purchase of qualifying building materials incorporated into facilities to generate electricity from renewable energy may be available. Materials must be purchased and incorporated into eligible projects before January 1, 2008.

A 100 per cent corporate income tax write-off and capital tax exemption for assets used to generate electricity from renewable energy sources may be available. Assets must be acquired before January 1, 2008.

For more details, contact:
Ontario Ministry of Finance,
1-877-4-TAX-FAX (1-877-482-9329),
www.fin.gov.on.ca/english/tax/notices/rst/31.html

Federal Accelerated Capital Cost Allowance

The 2007 Federal Budget included an Accelerated Capital Cost Allowance (CCA) for Clean Energy Generation. This 50 per cent accelerated CCA is provided under Class 43.2 of Schedule II to the *Income Tax Regulations* for specified energy generation equipment. Eligible equipment must generate either heat for use in an industrial process or electricity, by:

- Using a renewable energy source (e.g. wind, solar, small hydro)
- Using waste fuel (e.g. landfill gas, manure, wood waste), or
- Making efficient use of fossil fuels (e.g. high efficiency cogeneration systems).

Class 43.2 was introduced in 2005 and is currently available for assets acquired on or after February 23, 2005 and before 2012. For assets acquired before February 23, 2005, accelerated CCA is provided under Class 43.1 (30 per cent).

Eligibility of Biogas Production Equipment

Class 43.2 includes equipment used to produce, store and use biogas from the anaerobic digestion of manure, provided the biogas is used primarily for the production of heat for use in an industrial process, or electricity. The 2007 Federal Budget announced an extension to the list of feedstocks that may be used in biogas production systems eligible for Class 43.1 and Class 43.2 to include food waste, plant residues, and wood waste. This change will apply to eligible assets acquired on or after March 19, 2007.

For more details contact:
Government of Canada
1-800-O-Canada (1-800-622-6232)

OTHER ISSUES AND OPPORTUNITIES

Tippling Fees and Increased Biogas Production from the Use of Off-Farm Source Materials in the Anaerobic Digester

Off-farm-source materials have the potential to greatly increase the biogas production compared to basic manure and other agricultural byproducts. When receiving off-farm source materials that have high disposal costs in other conventional waste management systems, there is the opportunity of

receiving income from tipping fees obtained for processing the materials.

There are two ways to obtain approval for these types of systems. Some off-farm source materials are treated as “waste” under Ontario’s current regulations. A farm will need a Certificate of Approval (C of A) as a Waste Disposal Site from the Ontario Ministry of Environment to be able of receiving these materials. This may require notification of neighbours and posting of a financial assurance bond to ensure proper due-diligence.

Recent changes to the Nutrient Management Act (NMA) and Environmental Protection Act (EPA) facilitate the management of certain off-farm source materials to farm-based digesters through new regulatory limits in the NMA and an exemption from requirements under the C of A.

For more information on the new regulations visit the e-laws website:

www.e-laws.gov.on.ca/html/regs/english/elaws_regs_030267_e.htm.

For more details, contact your local Ministry of Environment District Office,
www.ene.gov.on.ca/envision/org/op.htm or your local OMAFRA engineer at
www.omafra.gov.on.ca/english/engineer/staff.htm

Connecting to Electrical Grids

To sell electrical power, you must connect the generator from the AD system to the electrical grid. This requires:

- An Ontario Energy Board (OEB) license
- An Electrical Distributors’ Connection Agreement, and
- Approval by the Electrical Safety Authority.

The local distribution company (LDC) should be the first point of contact for connecting to the grid.

A Connection Impact Assessment is one of the first processes that should be completed. There may not be adequate capacity in the electrical line to support the proposed generation capacity, or the costs for connection may be very high due to safety switches or other equipment needed. Due to the number of energy projects being considered and complexity involved, Connection Impact Assessments can take a period of time and should be considered at the start of any project proposal.

For more details, contact:
Ontario Energy Board, www.oeb.gov.on.ca or your local power distribution agency (LDC). In many rural parts of

Ontario, Hydro One is the local distribution company. Their contact information is 1-888-664-9376, and www.hydroone.com.

The following two web pages below provide information on connecting to the Hydro One grid. http://www.hydroonenetworks.com/en/electricity_updates/generation/default.asp
http://www.hydroonenetworks.com/en/customers/generators/generation_connections/distribution/queue_process/Application_List_FINAL.pdf

In addition, there is a large area in southwestern Ontario where there is very limited capacity for additional renewable energy generation capability. Farm-based biogas systems in this “transmission constraint zone” established by the Ontario Power Authority will be limited to a maximum size of 250 kW.

For more details contact:
Ontario Power Authority:
www.powerauthority.on.ca/sop

Obtaining Approval from Technical Standards and Safety Authority (TSSA)

Any biogas system that uses biogas as a fuel requires approval from Technical Standards and Safety Authority (TSSA). This approval covers the fuel storage, fuel handling and fuel utilization components of the system. A lead time of four to five weeks is required for an approval.

Contact www.tssa.org for more information.

Obtaining a Building Permit

Some components of a farm-based anaerobic digester will be classified as a structure. As a result, a building permit will be required before construction begins. The building permit is obtained from the municipal chief building official in your municipality.

Proponents of a project should ensure that the zoning for their property allows a farm-based digester system. It is understood that existing digesters operating in Ontario are currently treated as part of the farming operation. Most systems are essentially a part of the livestock manure system (improving the handling characteristics of the manure and causing beneficial pathogen and odour reductions).

OMAFRA’s Minimum Distance Separation (MDS) Formulae (with an objective to minimize nuisance complaints associated with livestock production) is to be applied to on-farm anaerobic digesters systems that

use manure as an input. An on-farm anaerobic digester may include a co-substrate input tank in which permitted off-farm, non-agricultural source materials are temporarily stored before feeding into the digester.

For more details contact your local OMAFRA engineer at: www.omafra.gov.on.ca/english/engineer/staff.htm, or your local municipal building official.

Taxation of Anaerobic Digesters

Before a farm-based anaerobic digester is constructed, the farmer should consider and clarify how the digester will be assessed for property tax purposes. It is understood that existing digesters operating in Ontario are currently treated as part of the farming operation. Farmers should also consult with their accountants to determine the most tax-efficient business structure in which to operate the digester.

CONCLUSIONS

The opportunities for developing on-farm anaerobic digester systems appear to be growing. Successful projects will take advantage of the opportunities identified in this document and ensure that all steps in development are considered, while at the same time being aware that there may be other issues and challenges not yet identified.

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Agricultural Information Contact Centre:

1-877-424-1300

E-mail: ag.info.omafra@ontario.ca

Northern Ontario Regional Office:

1-800-461-6132

www.ontario.ca/omafra