

# GREEN MATTERS

A newsletter from the Alberta Environmentally Sustainable Agriculture Council

## Waste not, want not

### From AESA Council's Past Chair

By Bruce Beattie,  
*Alberta Milk*



Roger Bryan /AAFRD

Ever since Rumpelstiltskin was reportedly spinning straw into gold, people have been looking for ways to add value to agricultural byproducts. Like the alchemists of old, we seek to convert elements that appear worthless into something valuable. As you read this issue of Green Matters, it may seem that fairy tales can come true.

With livestock production comes manure, historically used mainly as a source of nutrients for crops. When fuel was cheap and commodity prices high, the investment of time and money in technologies to convert large volumes of manure into an energy source made little sense for the agriculture industry. Today, rising energy costs and low commodity prices are changing that view. Agriculture is stealing a page from the oil industry, refining a product that was often considered waste, to extract all the value, and using nature's own processes to accomplish the goal.

The agricultural processing sector has similar issues of increasing costs and tight margins. Economics 101 says there are two ways to increase profits: decrease costs or increase prices. In our highly competitive retail sector, the latter is not an option. And any farmer will tell you, there isn't much room to reduce raw material costs. So the alternative is clear. Rather than spending money to dispose of what was considered waste, processors are capturing value from their byproducts and generating returns on both sides of the ledger.

Completing the story from the farm gate to the consumer's plate is the dairy industry's recycling program for milk containers. It's

a great example of industry working with municipalities to find solutions with winners on all sides. Recycling is not a new concept; pop cans, car tires and beer bottles have led the way in reducing landfill loads and recapturing energy and materials for new uses. What is special is the willingness of the dairy industry to share responsibility for what happens to the consumer waste from their products.

Yes, some fairy tales can come true, but sometimes there is a troll under the bridge, waiting to catch us off guard. We need to make sure this doesn't become the case with the issue of disposal of animal health care wastes from farms. The Alberta Environmental Farm Plan workbook identifies options for safe disposal of these wastes, but those options may not be readily available in every community. Here is an opportunity for the companies that manufacture and sell these products to come to the table with resources and partner with government and the agriculture industry to develop safe, convenient disposal options for producers.

There's no magic in being a successful farmer. Food production will remain our primary source of revenue, but to remain viable, we must continue to search out technologies that make economic sense. Finding ways to produce food more efficiently and with less environmental impact remains the central theme of the Alberta Environmentally Sustainable Agriculture (AESA) Program. Converting our wastes into assets will help in that effort.

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# More from Manure

In 2001, the Iron Creek Hutterite Colony near Viking was facing electricity bills of \$250,000 annually, manure management issues, and costly water shortages. Those challenges prompted the colony to partner with Ponoka-based BioGem Power Systems Inc. to build Alberta's first commercial facility to produce methane from manure. Now the colony is generating revenue from electricity sales, reducing its own heat and electricity costs, conserving water, lowering manure application costs, and minimizing odours.

Construction of the facility began in late 2001 and was completed within four months. The facility is sized to accommodate manure from a 1,200-hog farrow-to-finish operation. It can use manure from the colony's hogs, sheep, chickens and cattle. It can also handle the wastes from the colony's new slaughterhouse, but those wastes require grinding first.

The BioGem technology is European technology used in biogas systems around the world. Manure and slaughterhouse wastes are flushed into a receiving tank, and any solids are chopped into uniform pieces. Then the material is sent to one of the facility's three anaerobic digesters. Bacteria in the digesters naturally produce various types of gas including methane as they decompose and ferment the manure and wastes. The biogas is captured in a rubber cap and transferred to a piston engine, which generates electricity and heat.

The facility has an automated system to ensure the process produces uniform biogas amounts and quality (60 to 75% methane). The system generates 350 kilowatts (kW) of electrical energy per hour and 770 kW of heat energy per hour. Some of the heat and electricity is used by the colony and to operate the facility, and some of the electricity is sold to the provincial power grid.

The digestion process also produces wastewater and a nearly odourless biofertilizer – two vital benefits for the colony. Before the facility was built, the colony's manure application costs were high because the manure had to be trucked up to 25 km for application. The digestion process radically reduces manure volumes, thereby reducing application costs, and also minimizes odours. In 2001, the colony was hauling water



J. Meikle/OpenEnergy

The three digesters at the Iron Creek biogas facility

to meet its needs. So it added a system to purify the digester's wastewater for use as wash water, saving \$60,000 a year for water hauling.

The colony and the company jointly funded the facility's capital cost, an estimated \$2 million for the digester system (plus about \$500,000 for the wastewater treatment system). With the revenues and cost savings, payback for the digester system is about four years (see table).

The biogas company is now called *OpenEnergy Sources*, a division of Adam Integrated Industries Inc. "*OpenEnergy* handles the BioGem product line, the biogas plants, and the EnerBloc product line, combined heat and power facilities," explains Grant Meikle of OpenEnergy.

*OpenEnergy* is currently negotiating with three operations in western Canada to develop biogas facilities using manure and/or slaughterhouse wastes. Key issues for farmers interested in this process include maintenance, access to the grid, and the amount of manure needed to make the process feasible.

Regular maintenance is essential. *OpenEnergy* can provide it or train the client to do it.

The approval process for the Iron Creek facility to enter the grid took seven and a half months. Meikle hopes that can be streamlined in the future.

How big a livestock operation is big enough? Meikle says, "At today's energy prices, it would be feasible for someone who has, for instance, a 100-cow dairy." He adds, "If you're looking at a biogas plant in a smaller application and you're looking for a three-year payback, it probably won't be there. If you're looking for something that is going to take care of a manure or waste problem and have an eight- or nine-year payback, it will work for you."

*This article is partly adapted from Tanya McDonald's "A Changing Business Model at Iron Creek BioGem Plant", available at <http://www.climatechangecentral.com/resources/BiogasConferencePresentations.pdf>.*

## Financial considerations for Iron Creek digester system

Capital cost	\$2,000,000
Average electricity sale price	\$0.065/kWh
Operating and maintenance costs	\$0.02/kWh
Electrical energy output	350kW per hour; more than 3,000,000 kWh/year
Revenues for electricity	\$95,645/year
Savings in electricity	\$145,102/year
Savings in heat	\$202,954/year
Savings in manure application	\$100,000/year
Savings in water hauling	\$60,000/year
Estimated payback period*	4.1 years

\*Payback is based on electrical and heating revenue and savings as well as by accounting for reduced operating costs.

# Adding Value to Processing Wastes: Barriers & Benefits

One of the major economic issues facing agri-food processors is how to deal with their waste streams. Not only do they not get any money from their waste stream, they have to pay to dispose of it. If we can find a better use for the waste stream, they save the disposal fee and they also can perhaps get some money back from the waste stream. And if we can reduce the amount of material that ends up in the landfill site or municipal sewage, there is also an environmental benefit,” says Dr. Jimmy Yao, the program manager of AESA’s Processing Based Program.

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“The diversion of wastes works here, now, in a number of industries.”

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To get a better handle on the challenges and opportunities for adding value to agri-food process wastes, the Processing Based Program funded a study by Lethbridge-based Trimark Engineering Ltd. Yao says, “The study’s main purpose was to help to identify the scope, the amount of waste generated, and the amount diverted for other uses, and also to identify the barriers that prevent diversion into other uses.”

Trimark surveyed small, medium and large agri-food processors within a 100-km radius of the centre of Edmonton on the amount and type of wastes they generate and how they manage those wastes. It also surveyed potential users of these wastes on the types of waste they will accept, the amounts they require and their collection methods.

Agri-food wastes contain valuable components, like nutrients and chemical compounds, which can be used in the manufacture of such diverse products as animal feeds, industrial chemicals, compost and medicines. “If you put the waste to a higher usage, you are going to save money and be able to re-use or recycle those materials. Those are good things for the environment,

for the economy, for the processors and for the users,” says Trimark’s Bill Moses, who led the study.

However the study identified some significant barriers to diverting wastes to other uses. Moses notes, “Probably the biggest problem is that [most agri-food processors] are small generators of waste. For a garbage collector to come once a week is no problem, but to come and collect a small quantity of waste to be used for a different process is expensive... Another barrier is that the users of the wastes typically want a definable product to use and they want it at a certain rate. It’s hard for [processors generating small amounts of waste] to be consistent in that. Waste storage and handling is also a problem. Do you store it at the generator or at the user, and who pays for it? And that leads to the other big problem: financial issues. People aren’t motivated to do this unless there is some financial reward.”

But the barriers are not insurmountable. Moses says, “The most important conclusion we found is that [diverting wastes] can provide significant benefits. The diversion of wastes works here, now, in a number of industries. Large generators of waste are doing quite a good job in diverting streams of their residuals away from waste and into something recyclable or reusable. What we need to do is find a way to get small and medium generators, who all together do make a large quantity of waste, more involved.”

One of the report’s main recommendations is for government leadership and support for waste diversion systems. Moses explains, “The financial returns for the users of the waste and the producers of the waste are small on a case-by-case basis, so there’s not a high financial incentive for them to do it. However, they can make a little bit of money at it, so it’s probably

something that they will do if leadership and support are provided.”

He adds, “A whole host of things probably fit in with that [support]. One of them is providing information that people need on what their options are, what it will cost them, what the benefits are likely to be, where can they find users, and where the users can find the generators of the waste. And then people need some support with putting their system into place.”

Along with providing valuable information on agri-food process wastes and waste handling, the study has already spurred interest in potential business opportunities for collecting and adding value to these wastes. Yao says, “I think that is a very positive result for the study!”



Roger Bryan/AAFRD

# Recycling: Growing Choices for Albertans

Recycling options are increasing across Alberta. “Many communities in Alberta now have recycling facilities and in most cases these are drop-off facilities,” says Dave Whitfield, a Waste Reduction Specialist with Alberta Environment. As well, the range of materials that can be recycled is growing. For instance, Alberta’s electronics recycling program was launched in 2004, the first such program in Canada, and now several pilot programs for recycling agricultural plastics are underway.

Along with reducing and reusing, recycling helps to reduce landfill costs, conserve resources, and protect the environment from potentially harmful substances in the wastes. Whitfield says, “For many years burning barrels have been used as a way to handle wastes on the farm. However, some common wastes are not suitable for burning, for example, plastics. Plastics are prohibited debris – it’s against the law to burn them – because of the health hazard and the environmental problems caused when they are burned in anything other than an approved incinerator. It’s a much better solution to recycle.”

Whitfield suggests setting up a simple system to handle recyclables in your home. On the Whitfields’ farm, they have a set of stackable bins for dry recyclables like paper, glass and cans, and they take them to the recycling facilities every few weeks. To handle food wastes, they have two anaerobic composters. These plastic, cone-shaped composters are partially dug into the ground and have sealed lids so coyotes and other wildlife can’t get at the wastes.

Whitfield is excited about a new recycling opportunity. “Just in the past few months, markets have emerged in China for recycling agricultural plastics. We’ve been trying to find a solution for these plastics for years. Now for the first time we have a home for baler twine, silage wrap, mineral bags and other plastics.”

He adds, “Agricultural plastic presents some challenges as far as collecting and handling it and getting it in a form that can be sent to China. [So] right now it’s at the pilot phase. For example, the M.D. of Rocky View, Newell Recycling in Brooks, and the Mountain View Regional Waste Commission are all looking at different ways

of handling it.” Instead of being a barrier to recycling, the hay and straw that are sometimes attached to such plastics will be used in China for livestock feed.

Facilities for recycling a wide array of materials are located throughout Alberta. For information on local facilities:

- for plastic, paper, cardboard, metal, used oil, beverage containers and other items, call the Recycling Information Line at 1-800-463-6326.
- for empty and rinsed non-returnable plastic and metal pesticide containers, contact your Agricultural Fieldman.
- for tires and for TVs, computers and related electronics, visit [www.albertarecycling.ca](http://www.albertarecycling.ca) or call 1-888-999-8762

## Disposing of animal health care wastes

Proper disposal of farm animal health care products is important to prevent risks to human health, animal health and/or the environment. Since there are currently no province-wide programs that accept animal health care products from farms for convenient disposal, producers will need to check out the options in their own area.

The first step, of course, is to try to reduce wastes by: following veterinary advice for using pharmaceuticals wisely; following the storage recommendations on the product’s label; and purchasing just enough product for the intended use.

Dr. Joe Kendall, a Veterinary Toxicologist with Alberta Agriculture, Food and Rural Development, outlines practices for disposing of veterinary medicines. He says, “If the products are unopened, the company that manufactures the product will take them back, whether they are still in date or out of date.”

He notes, “If the products have been opened, then the veterinarian or a local hospital might take them. However, they are not required to take them. So producers would have to ask first

to see whether they will accept them.” If these disposal options are not available, then producers can contact a licensed landfill or hazardous waste facility to find out the proper disposal procedures for the particular product.

Sharps should be placed in a rigid, puncture-proof container with a secure lid. These containers can be obtained at many veterinary clinics. The containers should be labelled as “sharps, not for recycling” before disposal. Sharps are not accepted at landfills regulated by Alberta Environment, unless decontaminated and medically shredded. Contact your regional health authority for directions on the proper disposal of sharps.

If you have a large feedlot, the incineration facilities at Wainwright (call 1-800-563-2466) and Beiseker (call 403-947-2900 or 780-444-7133) can accept some types of animal health care wastes, if properly packaged.

Each spring, 4-H has collection programs for empty Dectomax and Ivomec containers. For details about these and other 4-H recycling programs, go to [www.4h.ab.ca](http://www.4h.ab.ca) or call 1-877-682-2153.

For more information, refer to the Beneficial Management Practices manuals (available at [www.agric.gov.ab.ca](http://www.agric.gov.ab.ca)) or participate in the Environmental Farm Plan process (call 1-866-844-2337 or visit [www.AlbertaEFP.com](http://www.AlbertaEFP.com)).



Sharps container

# COUNCIL PROFILES

Roger Bryan/AEFRD



## Mills Anderson

"I've always been interested in agriculture and the environment as a twosome," says

Mills Anderson. That dual interest shines through his careers as an engineer and a farmer, and his participation in agencies like the Alberta Canola Producers Commission and AESA Council.

After immigrating to Canada from Northern Ireland in 1969, Mills worked as a water engineer in western Canada. He says, "I had lots of opportunities to work with farmers [in the Peace region] and I thought it was such a beautiful part of the world. I decided I would get a job up there and be both a farmer and an engineer." So 31 years ago, the Andersons moved to their farm about 40 miles north of Grande Prairie.

They grow grains and oilseeds, as well as grasses for seed.

"[In the beginning], I didn't know anything about farming so I read as much as I could. I saw that people were railing against the loss of soil, and I learned about practices to prevent it," he says. "So right from the very start, I decided to not summerfallow, to do as little fall work as possible, and so forth."

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Mills continues to follow a stewardship ethic. For instance, he has developed an Environmental Farm Plan (EFP) and is an EFP review committee member. He says, "Being an environmental engineer for many years, I thought that my plan would be pretty short. But I was surprised at how many facets I had not thought about around the farm!"

Environmental sustainability is an important focus for the Alberta Canola Producers Commission (ACPC), notes Mills. He is a

director for this organization and represents it on AESA Council. ACPC's mandate is "to increase the long-term profitability of Alberta canola growers through research, promotional activities, consumer and producer education programs, and policy development."

One example of the commission's environmental interest is its support for integrated crop management research, explains Mills, who is a member of ACPC's research committee. This committee works closely with Agriculture and Agri-Food Canada researchers at Lacombe. They are finding that simple practices, such as seeding earlier and at higher rates, will produce a healthier, more competitive crop, thereby reducing the need for herbicides.

Some of ACPC's market development efforts also have environmental benefits, like using canola oil in products like diesel fuel and plastics. Mills is excited about biodiesel's potential. "We have a potential market for about 2 million tonnes of canola every year in Canada, and that's only putting a very small amount of canola diesel in each litre of regular petroleum diesel. And the resulting diesel fuel is cleaner burning, your engine lasts longer, and canola is a renewable resource."

Roger Bryan/AEFRD



## Bob Anderson

Land use and stewardship are important issues for Bob Anderson and for the

Agriculture and Food Council, the agency he represents on AESA Council.

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"I enjoy the networking, and I get some satisfaction from hopefully achieving some results along the way."

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Bob is the third generation to operate the family farm, located about half an hour's drive northeast of Calgary. That location has given Bob a front row seat on the increasingly rapid growth of Calgary and surrounding communities. His involvement with the Agriculture and Food Council (AFC) was initially sparked by his interest in land use issues, especially the loss and fragmentation of farmland.

He says, "I had been involved in Ag Summit 2000 [a major public consultation process], on the Land Use Action Team and [as executive director of the follow-up] land use conference in 2002. The recommendations we made went to both the Province and the Ag and Food Council because they were partners in Ag Summit 2000. My objective in joining the Ag and Food Council was to continue working on those land use recommendations." Bob has been a member of AFC since 2002 and is currently its secretary-treasurer. AFC's mission is "to be a catalyst supporting the Alberta agriculture, food and life sciences industry in growth, competitiveness, profitability and sustainability, enabling industry members to engage one another, their stakeholders, markets, consumers, governments and the public." It is composed of representatives from the industry's many sectors.

AFC has created a series of ad hoc committees to address the recommendations and reports from the Land Use Action Team and another Ag Summit team that looked at ways to reward stewardship. Bob explains, "Both of those issues were ranked highly in the Ag Summit process and also in [AFC's] review

of all the recommendations from the Summit. Our current committee is the Environmental Policy Initiatives Project, and we're dealing with policy options [for both areas]."

Bob's interest in stewardship also has its roots in the family farm. He says, "We started continuous cropping around 30 years ago, and we started minimum tillage close to 25 years ago. That's my father's influence. He's always been quite committed to good stewardship."

These days the Andersons raise Alberta Lamb, and all of their land is in pasture or hay for their sheep. The perennial forage cover reduces the risk of soil erosion and helps maintain and build soil organic matter. The Andersons are currently developing an Environmental Farm Plan for their farm.

Bob has been involved in many committees and councils over the years. For example, he's currently the secretary-manager for the Alberta Sheep Breeders' Association and a member of the Central Region Committee for AESA's Farm Based Program. He says, "I enjoy the networking, and I get some satisfaction from hopefully achieving some results along the way."

# Stewardship & Consumers: An Award-winning Recycling Program

The dairy industry contributes in excess of \$1 billion to the province's economy and touches virtually all Alberta consumers every day. But with that, comes responsibility. The industry recognizes that environmental stewardship is a central part of doing business. The Milk Container Recycling Program has enabled the Alberta Dairy Council to meet stewardship expectations while still allowing them to focus on the aspects of conducting dairy business that Albertans rely on," says Roberta Windrum of the Alberta Dairy Council.

The Alberta Dairy Council is the trade association for the province's dairy processors. The Dairy Council, milk producers, municipalities and the provincial government worked together to develop this voluntary program to recycle milk containers. The program was launched in 1999. It is guided by a board with representatives of processors, producers, consumers and municipalities.

In 2002, the program received an Emerald Award from the Alberta Emerald Foundation for

Alberta Dairy Council



Part of the advertising campaign for the Milk Container Recycling Program

Environmental Excellence. These days, more than 90% of Alberta residents have access to milk container recycling services through their municipally operated recycling programs. About 1600 tonnes of milk containers were recycled in Alberta in 2005.

Windrum says, "This program is a great example of industry and both municipal and provincial governments working together in the spirit of partnership."

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**"...working together in the  
spirit of partnership."**

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The program is funded by the three members of the Dairy Council who process and market fluid milk in Alberta – Parmalat Canada, Lucerne and Saputo Milk Division. They contribute a fee to the Container Recycling Fund for every 1-, 2- or 4-litre container of milk that leaves the milk processing plant.

Those fees fund the entire Milk Container Recycling Program, including payments to municipalities as well as communications and research activities. The program gives municipalities a top-up fee to stabilize the prices they receive for the used plastic and cardboard milk containers. It also provides municipalities with a transportation supplement to help with the cost of transporting the used containers to companies for recycling.

The program's communications and research activities are aimed at increasing milk container

recycling. At present, about half of the 75 million milk containers sold in Alberta each year are recovered for recycling.

The program conducts research to gain a better understanding of consumer recycling practices and of the barriers to recycling. It also carries out consumer research to help develop its effective, memorable advertising campaigns for motivating consumers to recycle. The program's 2002-03 ad campaign won an Rs of Excellence Award from the Recycling Council of Alberta.

The program's current ad campaign, called "Transformations", is based on the research finding that people want to know what happens to the used milk containers. So the ads show a jug or carton being transformed into an end product. Recycled jugs and cartons have a wide range of end uses including detergent bottles, tote containers, lawn chairs and corrugated cardboard.

Most recently, the Dairy Council and Global TV have developed a half-hour, documentary style TV program about the Milk Container Recycling Program, which was aired on April 23 on Global TV.

Windrum says, "If we are to have a clean, natural environment for our children, grandchildren and future generations, it is the responsibility of each and every one of us to do what is right. If recycling facilities exist in your community, then it is your responsibility to use those facilities."

To find out more about the Milk Container Recycling Program, visit [www.milkcontainerrecycling.com/AB/](http://www.milkcontainerrecycling.com/AB/).

## Green Matters, Issue No. 27, Spring 2006

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*Green Matters* is the newsletter of the Alberta Environmentally Sustainable Agriculture (AESACouncil). AESACouncil consists of representatives from Alberta's agriculture and food processing industry, environmental organizations and municipal, provincial and federal governments.

AESACouncil's vision is that Alberta has a thriving agriculture and food industry that is operating in an environmentally responsible manner. Its mission is to lead the agriculture and food industry in addressing environmental challenges. And its goal is to develop and deliver collaborative environmental stewardship initiatives that result in sustainable growth of Alberta's farm, ranch and agri-food processing industry.

The purpose of *Green Matters* is to provide a forum for discussion of environmental issues in Alberta's agriculture and food processing industry.

To subscribe to *Green Matters*, call 780-422-4385. *Green Matters* is also available online at <<http://www1.agric.gov.ab.ca>>.

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The Agricultural Policy Framework (APF) – A Federal-Provincial-Territorial Initiative