



RESEARCH By Wesley Emmott and Hayley Millard

New revenue stream

Dairy producers who invest in biogas digester systems can benefit from secondary income

Interest in agricultural biogas has increased greatly in the last few years. It is now recognized as a large potential energy source in Canada and a substantial potential secondary income source for Canadian farmers.

Farmers with larger herds who convert manure into usable energy are not only turning a profit by selling the electricity generated to the provincial power grid, they're using the excess heat for their homes and milking parlours, and to dry corn.

"Overall, the savings in energy can be quite substantial when considering how much energy a farm can use to heat their house and barns," says Anna Crolla, a University of Guelph, Alfred Campus researcher.

She cautions farmers not to rush into installing a system without first researching the technology and processes involved.

"You can't walk into this system thinking it will run itself," says Crolla. "It will take some work. However, the financial and environmental benefits from such systems can be substantial."

Crolla and other collaborators are taking an in-depth look at what it takes to operate a profitable biogas digester system.

They're also trying to determine how farmers can best optimize methane yield, by studying the environmental and agronomic benefits of methane digestion.

"This includes reducing pathogen numbers and odours in manure, reducing greenhouse gas emissions and possibly even increasing yields," says Chris Kinsley, also an Alfred Campus researcher.

Crolla and Kinsley have been conducting their research on two eastern



Farmers with large herds can convert manure into usable energy and turn a profit, provided they first research the technology and processes involved.

Ontario dairy farms, with herds of about 200 cows. To keep the digester running smoothly, they've been experimenting with adding co-substrates such as grease, food waste, energy crops and corn silage, which optimize methane production.

They're also investigating various co-substrates in several 30-litre lab digesters before moving to full-scale on-farm models.

"The co-substrates are high in organic matter and are essential to increasing methane production in manure digesters," says Crolla.


Although the co-substrates increase methane yields, manure is essential to the anaerobic process because it supplies the needed nutrients and has an excellent buffering capacity. It also controls the acidity and maintains a balanced pH level that does not inhibit anaerobic bacteria.

A 200-cow herd that uses manure and co-substrates in its biogas digester can easily support a 180 kilowatt (kW) generator, say the researchers.

They cost between \$4,000 and \$8,000 per kW of generator capacity. The payback period for most farms is seven to 10 years.

Producers who use a biogas digester can sell the electricity to the Ontario Power Authority (OPA) through its Feed-in-Tariff program. Farmers receive a monthly cheque for electricity generated and sent to the grid under contracts with the OPA.

Since biogas can be used to produce electricity if burned in a generator, or used directly in a boiler to produce heat, installing a biogas digester can be an attractive option for generating additional income.

"Ontario dairy farms can generate their own renewable energy and save financially," says Crolla. 

Wesley Emmott and Hayley Millard are student writers with the University of Guelph's office of research. This research is funded by the OMAFRA-University of Guelph partnership.