

Ridgetown's anaerobic digester ready to be connected

Officials at the college are confident the digester will be on the grid within six months

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Ontario Farmer

The reputation of the Ridgetown Campus as a centre of bio-industrial research is growing with the near completion of its anaerobic digestion energy plant.

Campus director Art Schaafsma says the connection to Hydro One's distribution system is expected within six months. At that point revenue – 18.5 cents per kilowatt hour – will begin flowing from the 250-kilowatt plant.

"It's to be a revenue generator so we can support where we're doing in the area of research," Schaafsma says.

"It has to pay for itself. It has to have its own budget and lean on its own revenues."

With the facility up and running, plans call for a research team to be pulled together.

One area of research will focus on the biodigestion process itself.

With two mini-reaction vessels in place, experiments will be conducted with a wide range of feedstock: various sources of manure, processing food wastes, restaurant wastes, crop residues and energy crops like hemp and switchgrass – virtually any type of organic material.

There's also an opportunity to explore the use of different enzymes and bacteria.

The challenge is to optimize the process and improve revenue streams.

This could involve maximizing the amount of biogas – the mixture of methane and carbon – produced. Biogas can be used to fuel engines to generate electricity.

With the carbon dioxide removed, it can be substituted for natural gas.

The digestate, the material left over once the methane and carbon dioxide is extracted, also has potential. It's often viewed as a marketable soil amendment.

The fibres can also be extracted and used for industrial applications, such as for the manufacture of bio-composites for building materials and car parts.

By adjusting the feedstock, the value of the fibres can be enhanced, Schaafsma says.

THE DIGESTATE can also be used as animal bedding, according to Matt Lensink, application manager with the technology provider, PlanET Biogas Solutions.

PlanET has been directly involved with five biogas installations in Ontario. Lensink says one, located in the Niagara area, is exporting nitrogen-rich digestate to the US.

Typically, the digestate from the process contains readily available phosphorus and micronutrients but little nitrogen. By adjusting the recipe this particular facility has developed two substantial revenues streams, one from elec-



Once Hydro One facilitates a connection to the grid, the anaerobic digestion system will generate revenue for a range of research projects.

tricity generation and a second from digestate sales, Lensink says.

Yet another area of research will explore the potential for the heat energy that can be captured from the engine generators.

Schaafsma says enough heat is available to warm five acres of greenhouse space. The challenge is to utilize that heat when during the summer months.

Drying produce or lumber are two possibilities.

The facility will provide educational and technology

transfer opportunities for students and rural residents.

With a grid connection in place, the facility will generate enough electricity to meet the needs of about 250 homes or what's used by the Ridgetown Campus. Barring downtime for engine service, it will run on a continuous basis.

In the future, the capacity may be doubled. The site was constructed with space for a second digester and a second engine to produce more electricity.

Schaafsma says \$3.35 million is tied up in the investment.

If a similar anaerobic digestion plant were built on a farm, it could cost around \$1.4 million with a payback in seven to nine years, Lensink says. There's less expense because most farmers already have a manure-holding facility and would forgo the various research components.

The Ridgetown site also includes a biodiesel research facility that was completed earlier.

The federal FedDev Ontario program contributed close to \$2.6 million toward the project. The Agriculture Research Institute of Ontario came up with another half million.

Chatham-Kent-Essex MP Dave VanKesteren emphasized the economic importance of the project.

"Our investment at the Ridgetown Campus will help research and develop and bring to the marketplace new tech-

nologies for the agriculture industry," he says.

"We're beginning to recognize our fossil fuels cannot be the sole source or even the main source for our electric power."



Matt Lensink

The original vision for the research facility began six or seven years ago with the old Southern Ontario Bio Initiative Network. This group evolved into the Centre for Agricultural Renewable Energy and Sustainability.

CARES is supported by individuals, the Municipality of Chatham-Kent, agricultural businesses like AGRIS Cooperative, Ontario's agriculture ministry and others.

Schaafsma has been instrumental in marketing the vision a reality. He acknowledges the support of the people at the main campus of the University of Guelph, including Dean Robert Gordon and Associate Dean of Research Beverly Hale.

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Ridgetown Campus director Art Schaafsma addresses visitors atop the college's anaerobic digester