



OTTERBURNE — It was, suitably, a ball of fire in the night sky that was a turning point for a Christian school's move towards environmentalism.

In late January 2014, the TransCanada Pipelines compressor station just west of Highway 59 blew, sending flames 200 feet into the air and melting part of Provincial Road 303, which leads to Providence University College.

"Students saw that and thought the world was ending," said business Prof. Bruce Duggan with a laugh, perhaps only partially joking.

About 4,000 Manitobans throughout southeast Manitoba were without heat for two weeks as crews scrambled to restore gas service.

Inside the college, however, students were kept toasty, despite temperatures dipping to -34 C with the wind chill. The school's relatively new biomass generator, perking along on wood pellets from nearby Hutterite colonies, continued apace.



*Bruce Duggan, business professor at Providence University College, explains the operation of the school's biomass generator.*

"When that blew up, we didn't have natural gas for two weeks," said Duggan, who is leading a tour of the college's alternative-fuel heating systems. "This (the biomass generator) is our belt and natural gas is our suspenders.

"We were glad we had a belt."

It's May 12 and there are 49 of us on this tour, an annual event by Sustainable Building Manitoba that aims to highlight projects in Manitoba that point the way to a greener future. The four stops are Providence, a district geothermal system in Île-des-Chênes, the City of Winnipeg's new East Yards complex and 482 Kylemore Ave., a study in passive-house construction.

The province may have low electricity rates that makes province-to-province comparisons difficult, said Dawn Fraser, chairwoman of Sustainable Building Manitoba, but it holds its own when it comes to building green.

"While the number of LEED projects is easily compared, the number of other sustainable building projects in Manitoba, such as PowerSmart, Passive House "shadow" and LEED "shadow" are difficult to compare because of different programming across Canada. However, it is safe to say the number of these projects is increasing each year at an exponential rate in Manitoba," she said.

"Leader or laggard? I'd definitely say leader."

LEED refers to a global program called Leadership in Energy and Environmental Design, and certification is administered in Canada by the Canadian Green Building Council.

At Providence College, four fuel sources provide heating to its campus: natural gas, electricity, biomass and geothermal. Duggan said it wasn't tree-hugging environmentalism that drove the college towards greener heat. Rather, it was fiscal prudence.

With both geothermal and biomass, heating costs remain relatively fixed over a long period of time, and it was a desire to shield the college's books from possible increases in gas and electricity rates that led the board of directors to explore alternatives, he said. He said that while the decline in recent natural gas pricing makes it a wash with biomass, the school is still happy about fixing long-term heating costs.

The first was a geothermal heating system for the Reimer Student Life Centre, using a horizontal loop system buried in the school's courtyard. Then, when the school was told by building inspectors to move an old post-and-beam barn away from the dormitory, along came the idea to use it to house a biomass generator and heat most of the school's spaces.

Biomass is old technology, having been used in Europe for a decade or more. It is, simply, a boiler, fuelled not by coal, gas or fuel oil, but by pellets made either from waste wood or waste grain products.

Wood pellets are delivered eight times a year, into a converted grain auger that automatically starts pushing the pellets into the two bins inside for storage. The system automatically feeds pellets into the combustion chamber on demand and ash is automatically deposited into a collector. A hot water-glycol mixture feeds into the school's radiators through a series of natural gas boilers that serve only as backup. These boilers automatically sense when the water temperature is low and fire up.



*Bruce Duggan demonstrates how a delivery driver drops off wood pellets, which automatically triggers the auger in the bin below to transport the pellets into storage inside.*

"What do we do with the ash? Well, we found it was almost chemically identical to fertilizer, so we put it on our lawn," Duggan said.

Appropriately, it's been a learning process for the school. The first lesson was finding out the new cafeteria building was oriented in the wrong direction, with most of its glass facing north, limiting heat gain in winter.

"Once we built it, we realized that, but it's very expensive to turn the building around. That's an argument for thorough, thoughtful design," Duggan said.

There was also the need to overcome trepidation about the biomass generator, which operates virtually without any attention from staff. Inspectors initially demanded the wood inside the old barn be clad in metal, for fire protection. They learned the biomass system is so efficient, it radiates little heat, pouring most of the energy into the water-glycol mixture.

Then, almost by divine intervention, the pipeline blew up.

"That laid to rest any fears about the biomass system," Duggan said.



Perhaps most importantly, Duggan said, the school's leadership has learned environmentalism goes hand-in-hand with fiscal responsibility and the school's mandate for "good stewardship of all that God has created.

"The fact it's all Manitoba technology and Manitoba employees made a big difference to our board and our constituency," he said. The biomass unit's water boiler was from Ontario, but the combustion chamber, grain auger, grain bins, ash collector and piping were made in Manitoba.

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