Market Segment: Landfill gas to energy

POWER PROFILE

EBI Énergie

EBI Énergie won and signed a 25-year agreement with Hydro-Québec to produce 9.4 MW of renewable electricity through 2036.

CUSTOMER
EBI Énergie

LOCATION
Saint-Thomas, Québec, Canada

CUSTOMER BUSINESS ISSUE
Renewable power generation using landfill gas processing

SOLUTION
Seven Cat® 3520C generator sets, CHP and switchgear

CAT DEALER
Hewitt Energy

POWER NEED

Through anaerobic digestion, biogas can replace natural gas as a renewable fuel source, providing numerous benefits to the environment, economy and energy market. Not only does biogas help reduce greenhouse gas emissions, it also generates reliable power at a fraction of the cost of traditional power sources.

As the biogas-to-energy formula became more efficient, the Canadian government passed a mandate to promote the generation of green electricity to reduce greenhouse gas emissions. As a result, electric power generation suppliers began working with government utility officials to create more sustainable options for electricity.

In 2010, Hydro-Québec—a state-owned utility in Québec, Canada—took the movement one step further by issuing an invitation for bid (IFB) for 125 MW of electricity derived completely from biomass. At the time, Québec did not have many renewable energy projects that could support such a large green-energy mission.

SOLUTION

In 1999, EBI Énergie, a waste processing company, installed its Dépôt Rive-Nord landfill facility to capture and burn off landfill gas to control the amount of methane gas released into the atmosphere. In 2003, EBI Énergie installed a gas treatment plant to turn the biogas into a renewable gas fuel for injection into the local gas pipeline. In 2010, after seven years of successful operation of the gas treatment plant, EBI Énergie won the IFB and signed a 25-year agreement with Hydro-Québec to produce 9.4 MW of renewable electricity through 2036 using excess biogas not already being sold to into the pipeline.

"Québec-Hydro asked us to guarantee capacity, and their requirements were strict," said Luc Turcotte, EBI general manager. "We were able to demonstrate that we will have enough landfill gas to produce the required amount of electricity for 25 years. It was a good opportunity for us."

Located 40 miles north of Montreal, EBI Énergie's Saint-Thomas cogeneration facility provides Québec-Hydro with electricity derived from landfill biogas. Using a sophisticated process, landfill gas is gradually transformed into pipeline quality gas through a combination of dehydration, compression, filtration and membrane separation. The Saint-Thomas cogeneration power plant takes excess fuel from the gas treatment facility before it is stripped of carbon dioxide and injects it into the pipeline. The facility is unique to Canada, representing the only location in the country where biogas is used both as a renewable pipeline fuel and a source of renewable electricity.

At the cogeneration plant located less than a mile from the fuel processing facility, EBI Énergie pumps 4,500 standard cubic feet of methane per minute to six Cat® G3520C gas

generator sets that convert the gas to electricity. A seventh unit serves as a swing generator. The G3520C generator sets are specifically designed to operate on biogas fuel.

EBI Énergie also required a fully automated facility that could be operated remotely. Local Cat dealer Hewitt Energy developed the SCADA control interface, which includes mobile capabilities, for the automated system. Operators can restart the plant using an iPhone app that connects to the SCADA system for engine monitoring in real time.

"It gives us a lot of flexibility to operate the plant, and it gives some comfort to the operator," Turcotte said. "They are not tied to the plant, and yet are able to interact when required."

Hewitt Energy also provides EBI Énergie operations personnel with service training, equipment support and parts maintenance.

"The main thing that we considered was the service aspect," said Turcotte. "We plan to be in business for at least 25 years, and we want to have a reliable partner. It was clear in evaluating the quotations that the after-sale service and the parts support set Hewitt apart. If we have a problem on Christmas Day or January 1st, we know that Hewitt technicians will be available to assist us."

RESULTS

Since July 2012, when the Saint-Thomas plant began producing electricity, the Cat generator sets exceeded uptime targets and have operated at 99.9 percent availability, producing enough energy to power more than 7,000 homes.

"These engines perform very well—it's perfect for us," said Turcotte. "When we started the project, we all knew that generator performance was a key to success."

The Saint-Thomas facility is pending approval as a Leadership in Energy and Environmental Design (LEED) Platinum facility—the highest rating in environmental engineering by the U.S. Green Building Council. The plant recovers aftercooler and jacket water heat from the engines to heat leachate treatment ponds in colder months. The microorganisms require a specific temperature for breaking down leachate that is collected and treated before being released into the environment. Without the heat recovery aspect, the facility would not be eligible for platinum certification.

"We are using the energy from the engine to heat the building, and also to heat the leachate," said Turcotte. "At this point, we are recovering only 13 percent of the waste heat, so when it makes sense to expand, we'll be looking to Hewitt for a combined heat and power solution to improve efficiency."

For more information, please visit www.catgaspower.com

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LEXE0719-00 – November 2013