

POWER PROJECTS



CUSTOMER: Waterloo Landfill

LOCATION: Waterloo, Ontario, Can.



Customer Requirement:

Maximize long-term electric energy production from 178- acre (72-hectare) Waterloo Landfill with capacity for 16.5 tons (15 million tonnes) of waste by 2028

**Scope of Supply:
Equipment**

5 Cat G3516 gas-fueled generator sets rated at 925 kW each (total 4.625 MW), plus fuel conditioning system, switchgear, and all other ancillary equipment.

Services

Complete turnkey design, construction, ownership, operation and maintenance.

Facility Owner: Toromont Energy Ltd. (wholly owned subsidiary of Toromont Industries, Ltd., Concord, Ontario, Canada)

POWER NEED

Green power wasn't the only reason the Regional Municipality of Waterloo, Ontario, decided to develop its 178-acre (72-hectare) landfill into a source of renewable energy. After neighbors raised concerns about odors and environmental impact, the Region built a well field in 1995 to collect and flare methane from the site.

"Recognizing the value of landfill gas, we decided to tap the resource for electrical power to make the landfill a benefit to the environment and the community," says Jim Archibald, director of waste management for the Region. Opened in 1972, the landfill was expected to accept waste until 2028 and to have sufficient gas supplies well past 2050.

Not having the expertise to build a power plant or market the power, the Region issued a request for proposals (RFP) to find a private partner to finance and operate the plant. Toromont Energy, a division of Toromont Industries of Concord, Ontario was selected as the plant developer.

As a leading developer of off-grid, district energy and cogeneration projects, Toromont Energy has designed and built more than 50 high-efficiency power plants over the past 15 years. Work on the Waterloo landfill project began in 1998.

SOLUTION

The well field built in 1995, with 50 wells, two blowers and one unit for flaring methane, ended the odor problem, but it burned off 1,200 cubic feet of gas per minute around the clock – fuel that had economic value. In 1998, the Region added 23 more wells to meet the needs of the planned power plant.

While the Region supplied the gas, Toromont financed the \$7.5 million plant, which it designed and built and now owns, operates, and maintains. Toromont pays the Region a royalty for the gas based on electricity revenues.

After about two year of design, construction, and testing, the Waterloo landfill gas plant went into full operation in 2000 with four Cat® G3516 gas-fueled generator sets, each rated at 925 kW. A fifth generator set added in 2002 brought the plant's capacity to 4.6 MW.

The installation includes a fuel conditioning system in which a condenser removes moisture and a filter further conditions the fuel by removing particulate matter and remaining moisture droplets. Blowers increase the gas pressure, delivering it to the engines at the required 5 psi.

The project would not have been financially possible without a parallel agreement between Toromont Energy and the local utility, Ontario Power Generation, for the sale of electricity and associated emission reduction credits. The project helps Ontario Power meet its own corporate greenhouse gas emissions targets and satisfy green power marketing initiatives in Canada.

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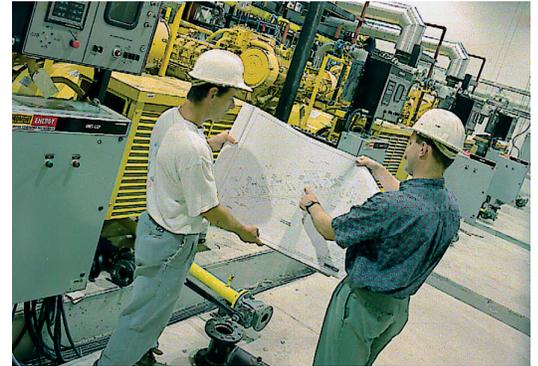
RESULT

The Waterloo project has been a success for all parties. Since the beginning, the power plant has operated at greater than 98 percent availability. The operating agreement requires a minimum 90 percent availability, with incentives for exceeding that level and penalties for falling short.

“Combustion of the landfill methane brought about significant net reductions in emissions,” says Archibald. “The green power from our facility offsets fossil fuel combustion by Ontario Power and provides the utility with emission reduction credits under Canadian law.”

The project also has earned recognition for excellence. In 2001, Toromont received the National Award for Innovative and Excellence from the Canadian Council for Public-Private Partnerships. That same year, the Regional Municipality of Waterloo won a Sustainable Community Award from the Federation of Canadian Municipalities.

As the landfill grows, more gas will be available and the power plant is expected to grow with the supply. At the beginning, the plant provided enough power for about 3,000 homes. A planned sixth generator set will increase capacity by nearly another megawatt. “By 2011,” says Archibald, “the plant could be providing enough clean, green energy for some 10,000 homes, while reducing fossil-fuel emissions – and turning what had been a neighborhood nuisance into a valuable resource.”



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