



The Power of Trash

Burlington firm uses plasma steel-arc process to turn garbage into heat, hydro

Byline/Source: Meredith Macleod - The Hamilton Spectator

Plasma technology has been used in steelmaking for years but a Burlington company is joining a growing wave of interest in using it to convert garbage into heat and electricity.

Plasma Environmental Technologies has developed a process it calls "plasma assisted gasification," which uses high heat to break down the molecular structure of non-recyclable household plastics, such as bleach and ketchup bottles, plastic car parts, inkjet cartridges, chipped tires, polystyrenes and styrofoam - and turn them into gas. This is stuff that's eating up valuable room at landfills but causes huge pollution problems if burned in traditional incinerators.

Plasma is a gas with an equal positive and negative charge. Plasma arcs have been used to make molten steel for decades but until recently, it was just too expensive to consider using it to reduce waste, said Alex Falconer, chief financial officer for Plasma Environmental.

It was simply cheaper to send non-recyclables to landfill. But landfill costs have skyrocketed in the past 10 years and municipalities across North America are desperately searching for ways to get rid of their garbage.

At the same time, there has been an energy crunch that has heightened the demand for alternative means of creating electricity. "When landfilling cost \$20 tonne and energy was 3 cents a kilowatt, no one was even looking at this technology. It just couldn't compete. That's all changed."

Plasma Environmental contends it can process suitable waste more cheaply than resorting to landfilling. The units are also small enough that they can be built at existing municipal waste transfer stations and industrial sites, eliminating the cost of transporting waste.

About one-quarter of the electricity produced would be needed to run the unit, the rest can be sold to the power grid or pumped back into the industrial operation, says Falconer.

"The blackouts we had a couple of years ago woke up a lot of companies that realized they can't afford the owntime."

It takes about 10 tonnes of waste to produce one megawatt of power. One megawatt is enough to power about 800 homes. A typical commercial unit would process about 20 tonnes of waste a day.

Plasma Environmental has just completed a prototype system capable of processing four tonnes of waste a day.

The goal is to test the system for five months and to have a contract signed for a commercial unit by the end of the year, says Falconer.

The PAG system uses an electric arc - like a lightning bolt - to super heat waste, instantly converting it to gas. That happens at a temperature of 2,000 to 10,000 degrees Celsius.

Putting that in perspective, the sun's surface burns at roughly 5,000 degrees.

But there is no burning inside the PAG unit because there is no oxygen. Proponents of plasma say there are no harmful emissions from the process. A slag material, which can be used for construction, and carbon dioxide are the only leftovers, says Falconer.

Turtle Island Recycling, in Toronto, a partner in the venture, sends about three million tonnes of such waste to landfills each year, said co-founder Louis Anagnostakos. "There are good markets out there for paper and steel but for some plastics and styrofoam, there is no market. "This has the added benefit of creating energy," he said.

Plasma Environmental, which trades on the TSX Venture Exchange under ticker symbol PE, has also partnered with Kinectrics to develop and test the technology. Kinectrics was once the research arm of the former Ontario Hydro and is now an independent company.

Young Ngo, general manager of technology solutions for Kinectrics, says a plasma unit can be built for a fraction of the cost of an incinerator. It can also be scaled to various sizes, depending on the waste available.

Somewhere down the road, PAG may be applied to handle dry sewage sludge and toxic and hazardous waste, says Falconer.

Beth Goodger, Hamilton's director of waste management, says the city is constantly examining technology that will divert more waste from landfills. It's expected the Glanbrook landfill site could run out of room by 2014 if the city doesn't divert more waste. Through a partnership with Niagara called Wasteplan, the city has studied eight alternatives to landfilling, including plasma, said Goodger.

The technology has not been used on a large-scale municipal basis, she said. There are about five established companies working on using plasma to convert waste to energy, says Falconer, and 20 to 30 more that have jumped on the growing demand for solutions to waste and energy problems.