

Waste to Energy Innovation

HIGHER TEMPERATURES USED TO PRODUCE GAS

BY SALVATORE SALAMONE

A NEW ELECTRIC PLASMA TORCH technology for turning waste to energy promises to be more cost effective than other gasification approaches and less polluting than using today's trash incinerators. And while some municipalities are eyeing the technology for their landfills, existing coal-fired plant operators might be able to leverage its benefits to meet increasing mandates for lower emissions.

Success and adoption of the electric plasma torch technology will hinge on the economics of the process. The basic idea behind the technology is that rather than simply burning waste as is done in most incinerators, the waste is heated to a much higher temperature and gasified. So rather than using the heat generated in the burning to produce electricity, the gas itself is used to generate electricity.

For years, gasification has had limited appeal because of the high costs associated with it. A handful of gasification plants have been tried in Europe and Asia where landfill space is at a premium and electricity costs have been high. This June, the private Canadian waste conversion and energy generation company Plasco Energy Group signed a letter of intent with the Ottawa City

Council and announced plans to build the first such large-scale plant in North America.

The company will own and operate a plant that will convert 400 metric tons of waste per day to synthetic gas to be used by engines. According to the company, generators driven by the engines and by waste heat from the conversion process will produce about 21 megawatts of power.

Gasification is not new, but the electric plasma torch approach adds

some new twists, while bringing along some challenges as well as benefits.

In traditional gasification scenarios, waste is exposed to extremely high heat in the absence of oxygen. This breaks the waste into synthetic gases – hydrogen and carbon monoxide – that are then used to drive turbines or engines to produce electricity.

Past plasma torch attempts would be used in conjunction with a power station. Electricity from the plant would pass a current through the waste, producing a hot plasma that in turn triggered the breakdown of the waste. Unfortunately, it took just about the same amount of energy to sustain the currents as would be produced. So the process was not economically viable.

This drawback has severely limited the use of gasification. A 2007 *CNET News* article noted that last year there were 89 waste-to-energy facilities in the United States that burned trash to produce power. However, there were no commercial gasification plants in the United States.

The Ottawa plant will use an electric plasma torch that the plant's backers claim carries out the gasification at lower temperatures, which in turn makes the operation more viable economically.

Besides the Plasco Energy Group, other technology providers in the field include Ze-gen and Westinghouse Plasma. Ze-gen has a pilot plant in operation and Westinghouse Plasma's technology is already used in a few plants in Japan.

COMPLEMENTING COAL PLANTS

Many of the initial plans for using the new gasification technology are for new plants typically run by a municipality. However, the technology can be used to help extend the life of existing coal plants by helping those plants meet new emission mandates. This can be accomplished by burning a mix of coal and synthetic gas.

Alter Nrg, parent company of Westinghouse Plasma, has identified more than 320 coal-fired plants in North America that could be repowered using the technology. When applied to a coal plant, the gasification converts coal to synthetic gases. The company claims these gases create a cleaner combustion process allowing older plants to meet newer, more stringent environmental standards on emissions of sulfur dioxide, mercury and nitrogen oxides including both nitric oxide, or NO, and nitrogen dioxide, or NO₂.

To that end, Alter Nrg has recently signed an agreement with independent power producer NRG Energy to repower the company's coal-fired facilities with the plasma technology.

NewsFlash

TAPPING OCEAN WIND POWER

New satellite maps could improve efforts to locate turbines in ocean locations to maximize wind power production.

The goal would be to place the turbines in areas where winds blow steadily for long periods, according to a report in *Geophysical Research Letters*.

The maps are generated by a satellite launched almost a decade ago to record wind speed, direction and power near the ocean's surface.

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New Core Shroud Inspection Technology



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