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The Great Methane Money Machine: Profiting From Biogas

Special Report

Its origins may not exude the sweetest smell, but biogas, which is the product of anaerobic digestion (decomposition without oxygen) of organic matter, such as sewage, animal waste, and municipal solid waste, serves as an excellent energy source that can help offset the use of nonrenewable resources.

For the purpose of this report, however, we will focus on only two of the largest sources of biogas that are actively being used right now for power generation: Landfill gas (LFG) and Agriculture/livestock manure.

Landfill Gas: Waste or Watts?

Municipal solid waste found in landfills produces a number of gaseous products. In these oxygen-lacking environments anaerobic bacteria thrive, resulting in the decomposition of organic materials, and more importantly, the production of carbon dioxide and methane. The methane, which is a principal component of natural gas, and can migrate out of landfills because it is lighter than air and not very soluble in water, can be captured by LFG energy facilities, and burned to produce energy.

For years, LFG was extracted from landfills and then directed to a central point where it was burned or “flared,” simply as a safety measure. (Landfills with over 2.5 million metric tons of waste in place are required by federal law to collect and either flare or utilize their gas.) Basically, it was free energy being wasted nearly 24 hours a day, seven days a week.

Today, however, there are more than 1,200 landfills across the globe that extract LFG and use it to generate electricity, process it into alternative fuels or send it into the gas pipeline network. And end-users have benefited with significant operational cost savings.

For example, NASA's Goddard Space Flight Center uses LFG to fuel its boilers, saving taxpayers around $3.5 million in fuel costs. Lucent Technologies estimates it saves about $100,000 per year on fuel bills by using LFG for the company's boiler system at its Columbus facility, and General Motors uses LFG at three of its assembly plants. At a truck assembly plant in Fort Wayne, Indiana, GM has estimated that using LFG has saved the company as much as $500,000 a year!

Even biofuel producer Abengoa Bioenergy has used LFG to reduce its use of natural gas. That has provided the company with an estimated cost savings of $1.4 million per year.

But is it good for the environment?

Of course, the environmental benefits of generating energy from LFG can't be ignored, either. This is especially true because methane, about 50 percent of LFG, is 23 times as potent as CO2, and has more than doubled its atmospheric concentrations over the last two centuries.

Today, China, India, the United States, Brazil, Russia, Mexico, Ukraine, and Australia are estimated to be responsible for about half of all global methane emissions stemming from agriculture, coal mines, landfills, and natural gas and oil systems.

The source of this methane varies depending on its country of origin. For example, in China, it is primarily from coal, and in Russia, it is primarily from natural gas.

Here in the United States, landfills are the largest source of methane emissions. In fact, about 25 percent of human-related methane emissions in the United States are from municipal solid-waste landfills. But it's now estimated than an LFG project can capture between 60 and 90 percent of the methane from a landfill (depending on the system), and then convert it to water or less potent CO2 when it's burned to produce electricity.

Agriculture/Livestock Manure

Beyond landfills, we can also trace another 8 percent of U.S. methane emissions to livestock waste. (The UN has actually stated that livestock are responsible for 18% of global greenhouse gas emissions) Although this resource is not as large as landfill gas, it is a source that continues to grow at a rapid pace due to the fact that humans are consuming more meat and diary products every year.

In fact, from 1999/2001 to 2050, global milk output is set to increase from 580 to 1,043 million tons, and global meat production is set to more than double in the same time. So unless the world's population converts its diet to one consisting of only fruits, grains and vegetables, the international community should expect to see a significant increase in cows and cow manure. This forecast does not take into account poultry, pigs, and sheep, where production is also expected to increase significantly. So as we continue to witness these production increases, we also witness serious environmental impacts, especially when it comes to greenhouse gases. However, this also ushers in additional opportunities for those operating in the biogas sector.

The EPA has noted that anaerobic digesters (systems that break down biodegradable material in the absence of oxygen) can help reduce greenhouse gases produced by “factory farms,” from which the world gets 74 percent of its poultry products, 50 percent of its pork, and 43 percent of its beef. Moreover, about 7,000 of those factory farms (or concentrated animal feedlot operations [CAFO]), operating in the United States could use anaerobic digestion cost-effectively and could reduce greenhouse gas emissions by an estimated 1.3 million metric tons.

As a side note, it should be understood that factory farming is probably one of the largest contributors to global environmental destruction and resource depletion. While it isn't our intention to preach, the negative environmental, social, and economic issues associated with factory farming are proving to stimulate the demand for organic and local agriculture. This reinforces our bullish position

on more sustainable agricultural practices.

While we certainly are not advocating irresponsible factory farming, we consistently monitor *all* areas of interest in the biogas sector as it relates to new investment opportunities.

Whether it's from landfills in the Northeast or dairy farms in the Midwest, the potential to convert massive amounts of biogas to usable energy is very real. And so are the opportunities for biogas investors.

You can view the HTML version here: The Great Methane Money Machine: Profiting From Biogas

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