Grumbles on water

energy wasted

By Benjamin H. Grumbles

The growing field of green energy and biogas

Methane may be the sweet smell of success in the future, at least in the growing "green" energy arena. If we tap into it correctly, we can unite water, waste and air policies and technologies to reduce pollution while producing power.

"Flaring," the burning of gases—in this case, methane at landfills and wastewater treatment plants—can reduce hazards, but it is also an admission of defeat, of sorts. While the burning helps to reduce the emission of methane directly into the atmosphere, the process signals a failure to tap into beneficial reuse. What can we do to help reduce the flaring and reuse the resource?

The more I learn about methane, one of the planet's top greenhouse gases contributing to global warming and climate change (20 times the global warning potential of carbon dioxide), the more interested I get in cost-effective, practical ways to capture the gas and put it to work.

Methane Reuse

That led me to two recent events in Arizona that drove home the increasing importance of methane as an energy producer. U.S. Environmental Protection Agency (EPA) statistics show that the number of landfill gas projects in the U.S. has increased by more than 100 since 2005—from 399 to 519 last year.

I toured Arizona's biggest and busiest solid waste landfill, Butterfield Station, in Mobile, located southwest of Phoenix. The point of the tour of Waste Management's operations was to learn about bioreactor, or wet cell, technologies to foster the production, capture and, most importantly, beneficial reuse of methane. Pipes at the landfill collect methane, an abundant byproduct of the busy microbes that decompose garbage. In Arizona, though, the arid climate often lacks the moisture to spur the chemical reactions to produce enough methane to fuel the combustion engine to generate sufficient electricity.

I also helped to dedicate the Glendale, Ariz., Energy Power Plant, a 2.8-MW biogas plant located at the city's municipal landfill. The plant will use methane to fuel two large combustion engines that will turn a shaft connected to a generator that produces electricity. That project will generate electricity for 750 homes serviced by Arizona Public Service Co. and, to celebrate all that green, clean energy, we even had lunch at the landfill that day.

Green Energy

EPA, the waste management and power industries and others are interested in collaborating to promote green energy in various ways. In our case, this could involve additional pilot projects and permits that include environmental safeguards and restrictions on liquids in landfill but also allow some liquids on a demonstration scale to wet the appetite of the microbes to produce the methane that fuels the engine connected to the electric generator. This same process also speeds the compaction and settling of landfills, which extends their life and delays the need for development of new landfills.

I've also met with wastewater officials who are still "flaring" but looking for opportunities to capture more energy and channel it into more positive directions. It's happening at many anaerobic digester treatment plants around the country, but the green biogas movement has a lot of room to grow. Hundreds of power-optimizing treatment works (aka POtws) are implementing combined heat and power projects, using biogas methane to run the facility or serve the community, but that number should be in the thousands.

At the Butterfield Station, the numbers are equally impressive. A Pinnacle West/APS pilot project's fact sheet says by converting landfill gas to energy we could reduce harmful NOX, CO and VOCs; for example, if the landfill produces 300 cu ft of landfill gas per minute, that could generate about 4 million kWh of electricity per year and reduce greenhouse gases equal to planting 8,300 acres of trees.

Speaking of numbers, EPA and its 31 partner governments are celebrating the fifth anniversary of the international Methane to Markets Partnership. The projects are reducing emissions by more than 27.3 million metric tons of carbon dioxide equivalent annually—equal to the annual emissions of 5 million passenger vehicles. Check out the Methane to Markets Partnership EPA website.

What more can the water and waste sectors do to tap into this growing field of green energy and biogas? For example, the Methane to Markets Partnership would benefit from more involvement by the water sector. We should all be thinking about ways to plug into the clean air and green energy movement. WWD

Benjamin H. Grumbles is director of the Arizona Department of Environmental Quality and former assistant administrator for water, U.S. EPA. Grumbles can be reached at grumbles.benjamin@azdeq.gov.

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