Bottom Lines

[11] Shifting Focus From CO_2 to Methane Could Be Short-Term GHG Solution

According to a recent op-ed in *The Wall Street Journal*, we should forget about CO_2 for now and concentrate on methane.

"Sometimes called the 'other greenhouse gas,' methane is responsible for 75 percent as much warming as carbon dioxide measured over any given 20 years," states the editorial, "A Fast, Cheap Way to Cool the Planet," by Robert Watson and Mohamed El-Ashry.

True, methane only hangs around for 12 years or so, while CO_2 stays in the atmosphere for hundreds. But in that short time, methane packs a big punch. "Where we stop methane emissions, cooling follows within a decade, not centuries," Watson and El-Ashry write. "That could make the difference for many fragile systems on the brink."

We already know how to reduce methane emissions, and it is way cheaper than capturing and sequestering CO_2; those technologies, still in the research phase, will take millions of dollars to move to market.

According to the EPA, about 40 percent of current methane emissions comes from fossil fuels. Another 30 percent is from landfills, wastetreatment facilities and stationary combustion, while the rest—another 30 percent—comes from agriculture. "For most of these sources, relatively cheap 'end of pipe' technologies are available to collect methane and convert it to useful energy rather than venting it to the atmosphere," the *WSJ* article reports.

But there hasn't exactly been a boom in construction of anaerobic digesters at dairy farms, or landfillgas energy projects—especially compared to other renewables like wind and solar. Barriers to increase deployment of methane capture technologies include cost, low financial incentives, and the relatively small size of many dairies, which don't produce enough manure to make it economically feasible to produce electricity from methane.

In California, there is also a regulatory hurdle. According to the January 2010 issue of *BiomassMagazine*, California leads the nation in dairy farming, with some 2,700 farms. But only 16 of them operate digesters, and a quarter of those are small in scale.

One reason is that the majority of California's dairy farms are in parts of the state with serious air pollution problems, like the San Joaquin Valley and the Sacramento area. Air-pollution control agencies in those areas have set strict standards for emissions, including limiting the concentration of nitrogen oxide in an exhaust stream to 9 ppm (parts per million) or less, said Mike Marsh, CEO of trade group Western United Dairymen, which represents California dairy farmers. Although anaerobic digesters significantly reduce methane, the combustion engines used to make electricity from that methane release NOx. Marsh said one dairy that had been generating electricity is now burning off two-thirds of its biogas because the digester's engines released over 1,000 ppm of NOx. The owner was ready to install a larger, more efficient engine that would release only 40 ppm, but the air-pollution control agency rejected that proposal.

"It was the most efficient we could find, but the air district refused," Marsh said.

"We have argued the net environmental benefit of such projects, but are not getting attention to it," Marsh added.

Wastewater plants and landfills are having the same problem, said Allen Dusault, sustainable agriculture program director for the nonprofit Sustainable Conservation. "Hundreds of megawatts are being wasted because we are not able to get the permits," he said. Regulators are "looking at NOx, not renewable energy and the other benefits. We have got to move beyond that."

In the meantime, another promising approach is being tested. BioEnergy Solutions has reached a long-term fixed price agreement with Pacific Gas & Electric to provide the utility with renewable natural gas the company gathered from a number of California dairy farms.

BioEnergy's approach is to build methane digesters and capture gas from a cluster of multiple dairies—with at least 20,000 cows per cluster—and lay pipelines to move the gas to a central scrubber, said BioEnergy spokeswoman Renee Rippchen. "We are going to build central scrubbers in different geographies throughout [California's] Central Valley, in most cases locating them at a host dairy that's close to PG&E's pipeline, so we can scrub it in that location, pressurize it and inject it into their line," she said.

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Rather than building small generators at each farm to produce electricity, BioEnergy is pursuing a "more efficient conversion of methane to electricity" by injecting the natural gas in PG&E's pipeline, so the utility can convert it at one of its larger power plants, Rippchen said.

Another promising option, said Sustainable Conservation's Dusault, is using biomethane to fuel vehicles— like milk trucks. A dairy farmer in the Bakersfield area has already converted several trucks to biomethane. Similarly, Waste Management is using methane from its Altamont landfill to make liquefied natural gas to fuel its garbage trucks.

But the good news for the dairy industry, said Dusault, is that "we are working on technology solutions to the NOx emission problem . . . that we think in the near future will offer another way to reduce these emissions."

In areas that don't have air-pollution issues, another approach is to aggregate waste streams. That's what Spokane, Wash.'s Barr-Tech LLC is doing with the anaerobic digester it's building at the Barr Regional Bio-Industrial Park near Sprague, Wash.

The digester will produce between 1.8 and 2.8 MW of electricity, which Barr-Tech will sell to nearby electric cooperative Inland Power and Light under a 20-year contract. Barr-Tech founder and GM Larry Condon said the digester will process sewage waste, as well as organic products from commercial sources such as grocery stores, food processors and city and county facilities.

What makes his project more financially viable is that Barr-Tech has multiple revenue streams: Besides the digester, Barr-Tech operates a compost facility at the Bio-Industrial Park and charges both collection and disposal fees. "We don't have just one technology; we bring multiple processes to one facility," Condon said.

His business model is to collect multiple waste streams in a zone. "We can process a wider range of organic and municipal solid waste, which makes the whole package more viable," Condon said.

So even with the current barriers, capturing methane and using it to produce power can be done—now. While the scientists are perfecting CCS technologies, the energy industry on the ground ought to be picking up the slack by seriously tackling methane ***[Jude Noland]***