KARMA

U.S. Trails in Converting Manure to Power, But Israeli Start-up May Offer Solution

By Matthew Kalman

KARMA IMPACT August 16, 2019

STORY LINK: https://karmaimpact.com/u-s-trails-in-converting-manure-to-power-but-israeli-start-up-may-offer-solution/

While animal manure is piling up around the world, threatening widespread pollution, the U.S. trails Europe and other parts of the world in finding a solution.

Each year, organic waste from America's eight billion cows, chickens, turkeys and pigs produce more than 2.5 million tons of methane, or about 10% of the country's total emissions of a greenhouse gas 25 times more destructive than carbon dioxide. Converting animal waste into household methane gas and fertilizer could cut U.S. methane emissions by 85%, says the Environmental Protection Agency.

The key method for turning animal waste into energy is anaerobic digestion, a microbial process in which microorganisms break down biodegradable material in an oxygen-free environment, converting it to biogas alongside liquid matter called digestate that is rich in nutrients and can be used as fertilizer.

But while Europe has more than 17,000 farmyard biogas installations to treat manure, producing more than 65,000 gigawatt hours of electricity, the U.S. has less than 300, generating the equivalent of 1.14 million megawatt hours. The EPA says there should be 18,000 plants in the U.S. alone.

Major corporations including Chevron U.S.A. Inc. and Smithfield Foods, Inc. – the world's largest pig farmers – are building biogas facilities, encouraged by financial incentives in several states, led by California. Redding, California-based Maas Energy Works, an early biogas leader, has 19 digesters online and 41 in development.

Animals worldwide will produce about 4 billion tons of manure each year by 2030, according to a 2018 study, helping to fuel a global biogas market expected to grow to $30 billion by 2026.

"Our recent research shows that anaerobic digestion and biogas can help reduce global GHG emissions by 10% to13% and in some of the hardest to decarbonize sectors: agriculture, transport, and heat," says David Newman, president of the World Biogas Association. "We're currently only processing 2% of the organic feedstock available into green energy and bio-fertilisers."

The release of a blistering report in early August on climate change by the Inter-Governmental Panel on Climate Change highlighted the urgent need to reduce carbon emissions on livestock farms.

Animal waste threatens public health and water supplies. In the Netherlands, 80% of dairy farms produce more animal manure than can be used on their own land. In China, changes in farming practices led to massive pollution of rivers with animal manure.

But anaerobic digestion takes months, and the digestate slurry fertilizer it produces has such high concentrations of nitrogen and phosphorous that its use is now limited or banned in parts of Europe. Transporting it is costly and undermines the carbon offset.

Israel's SGTech

SGTech, a small Israeli start-up, says its technology reduces the process from months to days and cuts investment costs by half while at the same time eliminating harmful waste, boosting the biogas's energy yield and cutting the amount of solids for compost.

By breaking the microbial process down into stages, monitored by sensors to build a dataset to train artificial intelligence algorithms, SGTech controls the operation to raise biogas methane content to

65%, compatible with industry standards to produce electricity, says Liron Friedman, SGTEch's head of research.

SGTech's process also eliminates the need for huge, foul-smelling lagoons where waste is left to dry for months. The final by-product is low-nutrients, reusable water with up to 90% of the nitrogen and 70% of the phosphorus removed, he says.

"We are comparing our technology to any other available solution," Friedman says. "In terms of cost and environmental impact, our method is more efficient," he says.

SGTech's technology is being piloted at small-scale farms in Israel. A British pilot is planned on a medium-sized farm and the company is waiting for a strategic partner to help it scale for the vast U.S. market.

While anaerobic digestion has been around for decades, efforts to increase the methane and improve the digestate were stuck, says Anton Wibowo, CEO of the Trendlines Agrifood Innovation Centre in Singapore.

"It's very challenging and difficult to get a consistent biological process within the tank. It varies from one batch to the next," Wibowo says. "If SG's claim is true, then it is a big game changer. That means they really have solved the problem."

The northern hemisphere needs back-up renewables in winter, says Chris Huhne, the former UK secretary of state for energy and climate change who is now a strategic adviser to the British Anaerobic Digestion and Bioresources Association. He advised SGTech on a UK pilot.

"You need to have renewable technologies that can be turned on and off for the times when the sun is not shining and the wind is not blowing," says Huhne. "The basic cost curve for anaerobic digestion has been pretty flat while the cost of solar and wind has been plunging. The SGTech technology is a big step change which potentially puts anaerobic digestion on a par with the kind of cost reductions you've seen in solar and wind, so it's very exciting."

"The potential for adding SGTech units to the vast dairy units in the U.S., solving any digestate problems and producing a lot of biogas that can be used to generate electricity for the unit and the grid is really attractive," he says.

STORY LINK: https://karmaimpact.com/u-s-trails-in-converting-manure-to-power-but-israeli-start-up-may-offer-solution/

Matthew Kalman reports on Middle East tech, business and the environment from Jerusalem.