



The Big Oil and Big Ag Ponzi Scheme: Factory Farm Gas

Introduction

A new, dangerous form of corporate consolidation is sweeping the nation: the marriage of Big Oil & Gas with Big Agribusiness. Decades of organizing has exposed oil and gas companies for their roles in perpetuating and covering up the climate crisis.¹ Similarly, industrial agriculture companies are under scrutiny for their role in creating the polluting and unjust factory farm system.² Faced with this, Big Oil and Big Ag are desperately trying to rehabilitate and greenwash their public images. Their new favorite “green” buzzword — biogas — and its false promises of “renewable natural gas” is one way in which these two polluters are teaming up in attempts to do just that.

Bearing President Biden’s stamp of approval, and picking up millions in federal funding, Big Ag and Big Oil are throwing big money behind this myth of “green gas.” This myth is a smokescreen to distract from these industries’ bread and butter — climate, water, and air pollution.

In this report, Food & Water Watch maps extensive industry investments in factory farm gas, detailing how the biggest fossil fuel and agriculture polluters are teaming up to profit on the myth of green gas. The

report outlines how massive public investments have driven this latest feeding frenzy for corporate polluters. Ultimately, this investment has turned our agricultural system on its head, making producing food a byproduct of a profitable manure industry. The implications for the climate crisis are severe.

What Is “Biogas”?

“Biogas” greenwashes dirty factory farms and their fossil fuel partners

Much of what the agricultural industry calls “renewable natural gas” or RNG is really factory farm biogas. “Biogas” or RNG refers to the mixture of gases that are produced after organic materials are broken down in a process called anaerobic digestion.³ Anaerobic digestion is as simple as it is dirty. Waste goes into an oxygen-free space called a digester, and even more waste and gas (mostly methane and carbon dioxide) come out. The input waste, or feedstock, can be anything from factory farm manure and litter to sewage sludge. The output waste is called digestate.⁴ When the feedstock is animal waste, it is often sourced from large factory farms, which produce a tremendous amount of pollution and liquid waste.⁵ The resulting gas from these operations? Factory farm gas.

This biogas can be used directly to produce electricity or heat,⁶ or the biogas can be upgraded through the removal of hydrogen sulfide, carbon dioxide, and moisture.⁷ At this stage, this upgraded gas is called RNG or “biomethane.” Upgraded RNG is often interchangeable with fossil or fracked natural gas, used primarily for vehicle fuel. This end product has a higher methane content than raw biogas.⁸

These agreeable names obscure the realities of this gas, furthering the industries’ goals. Calling what is filthy factory farm gas “biogas” or “RNG” is itself part of their greenwashing, as calling an energy “renewable” means nothing tangible. Renewable does not actually indicate that the energy has low emissions or beneficial impacts on air quality. Similarly, marketing the gas as “clean” is just another way to greenwash the fuel, as it is nothing of the sort. These industries are intentionally manipulating public perception and understanding of ideas like “organic materials” and “renewable gas” for their own profit and public image.⁹

Betting Big on Factory Farm Gas

Big Oil and Big Ag are investing billions into partnerships on factory farm gas

Big Oil and Big Ag are funneling money into factory farm gas. From 2017 through 2021, private investment in factory farm gas tripled, rising to over \$1.6 billion.¹⁰ Three of the biggest United States oil companies and the nation’s largest pork producer are betting big on factory farm gas, spending billions across the industry.¹¹ Thanks to this investment, across the U.S., the number of planned and operational factory farm gas facilities jumped by over a third in 2021 compared to 2020.¹²

An industry around designing and building digester projects has sprung up alongside this money, with the top independent firms growing 300 percent from 2019 to 2020.¹³ Between three of the largest oil companies in the U.S., there are five joint ventures with these types of factory farm gas companies,¹⁴ and they own or finance up to 143 digesters or upgrading facilities.¹⁵ Shell and BP each purchased one of these companies in 2022, spending over \$6 billion combined.¹⁶ Before 2017, not a single one of these companies used the terms “biogas” or “renewable natural gas” in any of their corporate sustainability reports.¹⁷

On the Big Ag side, Smithfield is a leading biogas proponent. Smithfield alone has three joint ventures, two of which are with Dominion and Duke Energies respectively. They operate on at least 115 factory farms across the country.¹⁸ Other Big Ag names, like Perdue and Tyson, are just beginning to enter the factory farm gas bonanza.

Oil and Gas

Chevron considers itself “well positioned” to be a “U.S. market leader in RNG,” committing over half a billion dollars to factory farm gas as of September 2021.¹⁹ Chevron’s most notable partnership is with California Bioenergy, or CalBio. Their current collaborations include more than 80,000 cows, and they view the other 1.8 million cows in California as opportunities to grow²⁰ — rather than scale back — factory farms. Chevron initially helps fund the digesters and then sells all the gas in California markets,²¹ where financial incentives are higher for biogas than for any other fuel source.²²

Although this is its most well-known joint venture, Chevron does not stop there — it is also partnered with the digester company Brightmark. The partnership began in 2020²³ and expanded again in 2021,²⁴ with at least 18 digester projects spread across 8 states.²⁵ Chevron also purchased biodiesel maker Renewable Energy Group for \$3.15 billion in February 2022 — its largest alternative fuel purchase to date.²⁶

BP is similarly embedded in the factory farm gas market, saying to investors that part of its strategy to drive higher returns is to “grow biogas production and marketing.”²⁷ One of BP’s most prominent joint ventures was with Archaea Energy and Aligned Digesters, which formed in June 2020 to develop four new dairy projects in the California Central Valley. The gas would then be injected into the Pacific Gas & Electric gas pipeline to be sold into fuel markets, with an anticipated cost of \$29.5 million.²⁸ The joint venture did not last long, however, as BP moved to buy Archaea Energy and absorb its projects in October 2022 in the largest-yet factory farm gas acquisition at \$4.1 billion.²⁹

BP also invested more than \$50 million into its venture with Clean Energy Fuels, in which the pair develops, owns, and operates projects at dairies.³⁰ This works in tandem with BP’s agreement with Gevo NW Iowa RNG, from which BP buys factory farm gas produced from more than 20,000 cows in Iowa.³¹ The real money for projects like this can come from pollution trading

programs like California's,³² and, in this case, factory farm gas is monetized by BP through agreements with Clean Energy Fuels Corp.³³ BP also has a 15-year agreement with CleanBayRenewables to buy gas made from poultry litter, to then sell in California.³⁴

Not to be left behind, Shell is sponsoring projects in Idaho, Oregon, and Kansas, plus a fueling distribution site in California.³⁵ As of November 2022, the company has one operational site and four under construction.³⁶ Shell also purchased the largest factory farm gas producer in Europe, Nature Energy, for \$2 billion that November.³⁷ The company is looking to set up in Minnesota and Wisconsin, using dairies and local pipeline infrastructure to do so.³⁸

Agriculture

Smithfield has centered its greenwashing efforts on factory farm gas, proclaiming that it will use up to 100 percent of its hogs on company-owned factory farms in four states to generate this gas.³⁹ The company has partnered with several utilities, namely Dominion Energy and Duke Energy, to work toward this. Smithfield's joint venture with Dominion, Align RNG, already spans Arizona, North Carolina, Utah, and Virginia,⁴⁰ with California, Colorado, Iowa, and Missouri flagged for expansion.⁴¹

These projects, and the most viable factory farm gas projects, entail covered manure "lagoons," or massive cesspools filled with liquid effluent.⁴² Smithfield uses these cesspools to produce the gas, which is then upgraded to be shipped through underground pipelines.⁴³ These "lagoon" systems are also responsible for a host of other environmental and public health issues like contamination of drinking water and harmful algal blooms in rivers and lakes — pollution problems that the gas production process can make worse.⁴⁴

Smithfield and Dominion Energy will pay for the dangerous infrastructure to inject gases into pipelines, but farmers are on the hook for digesters and lagoon covers, extremely expensive technologies.⁴⁵ Similarly, Smithfield and Duke Energy's Optima KV project uses five farms with digesters, injects the gas into pipelines owned by Piedmont Natural Gas, and sells to Duke Energy.⁴⁶ Smithfield has an additional joint venture with Roeslein Alternative Energy, called Monarch Bioenergy, which installs digesters on Smithfield's Missouri farms.⁴⁷ Its eight digester projects in Missouri are valued at \$150 million.⁴⁸



Rainwater and other debris collect in puddles on the cover of a manure lagoon located at a Pennsylvania dairy.

Not to be outdone, other Big Ag giants are also getting in on the profits and greenwashing. Perdue, for instance, entered into an agreement with Bioenergy Devco to sell a 20-year supply of Perdue poultry and hatchery byproducts to Bioenergy Devco's factory farm gas facility.⁴⁹ Bioenergy Devco has applied for permits for the first proposed industrial poultry waste digester in the area.⁵⁰ Tyson, meanwhile, partnered with NW Natural to generate gas from beef packaging plants, beginning in Nebraska in 2021.⁵¹ The project cost was an estimated \$8 million, although the company was looking to defer costs.⁵² This is only a taste of how these companies are getting into the industry, and there is good reason to believe they all have their eyes on expanding factory farm gas.

Public Incentives and Pollution Trading Fuel the Schemes

State and federal money is pouring in to encourage expansion of factory farm gas

Public money funds these private profits. In a study of a California digester, more than 90 percent of the digester's revenue came from selling government-endorsed environmental credits. Selling fuel on the

market brought in only \$149,000, while federal and state programs generated a staggering \$1.9 million.⁵³ At least 71 programs across 31 states are offering financial incentives for anaerobic digesters, including corporate tax credits and grant programs.⁵⁴ These programs have varying levels of success, with some funding digesters that fail repeatedly and destroy the local environment.⁵⁵

However, the most developed state program for digesters to turn a profit off is undoubtedly California's Low Carbon Fuel Standard (LCFS) program.⁵⁶ The LCFS is a pollution trading program, designed to help decarbonize the transportation sector by offering credits for fuels with lower carbon intensity. The state considers factory farm gas to have the lowest transportation carbon intensity.⁵⁷ For all its buzzwords, this policy incentivizes continued emissions and expanded production. California's LCFS and Cap-and-Trade programs are the main source of revenue for factory farm gas projects,⁵⁸ and companies are centering their factory farm gas business models around this funding.⁵⁹

Federal funding is another gold mine. The U.S. Department of Agriculture (USDA) is eager to fund anaerobic digesters, offering loan and grant programs to finance the schemes. Tom Vilsack, the Secretary of Agriculture, has voiced his adamant support for digesters since 2013.⁶⁰ Even during some of the earliest iterations of federal endorsements, funding for digesters was only made available for massive factory farms, requiring at least 1,000 animal units to qualify.⁶¹

President Biden also endorsed digesters in his 2021 Methane Emissions Reduction Plan, which calls for expanding on "incentive-based and voluntary partnership efforts" to reduce the agricultural sector's methane emissions. Biden has advocated for increased biogas funding, programs, and research to scale-up this so-called renewable energy.⁶²

The federal Renewable Fuel Standard is similar to the LCFS. Petroleum refiners or importers must obtain credits, known as renewable identification numbers, or RINs, to meet renewable fuel targets set by the U.S. Environmental Protection Agency (EPA).⁶³ RINs can then be sold to or used by conventional fuel producers to meet EPA quotas.⁶⁴ A variety of biogas feedstocks qualify under this program, including manure-based factory farm gas. Biogas is once again considered the most valuable of renewable fuels. Problematically,

these credits can be layered onto other programs like the LCFS.⁶⁵ New proposals in the works would allow for even more expansion in the biogas industry, by allowing new credits to be generated from burning factory farm gas in inefficient generators to produce electricity.⁶⁶

The 2022 Inflation Reduction Act (IRA) further expanded financial incentives for biogas, signaling steady federal support. The IRA extended the Section 48 Energy Investment Tax Credit to include a 30 percent credit for "qualified biogas properties" — the same amount given to wind and solar. This could be hiked up to 50 percent if projects are sited in "high energy areas" or brownfields, which are already unduly burdened by environmental injustices. These credits include factory farms, which will benefit immensely. The legislation also invested \$2 billion into the USDA's Rural Energy for America Program (REAP), providing loans and grants to biogas facilities and farmers.⁶⁷

Industry groups are aware of these changes and expect massive expansions to go along with them. With the implementation of the IRA, the American Biogas Council envisions 8,600 new digesters on factory farms with dairy cows, hogs, and poultry.⁶⁸ It is well known that, without this level of public funding, the projects would fail. Digesters are too dependent on government subsidies to be viable on their own, meaning that if policy were to ever change surrounding digesters, they would become too risky for private investment.⁶⁹ Companies openly admit that incentives are the reason for digester profitability,⁷⁰ and as of 2023, Big Oil is already rolling in record profits⁷¹ as this government money continues to pour in.

Investment Drives More Climate Emissions

Money is leading to a system where emissions are necessary and encouraged to maintain gas production

As manure goes from a waste stream to a revenue stream, corporations are eager to cash in. Public investment pouring into factory farm gas is creating perverse incentives, where animal agriculture could become more about maximizing manure production over animal products.⁷² The system itself depends on generation of emissions to remain financially viable, doing nothing to reduce emissions from the source.⁷³

By locking in existing herd sizes and even incentivizing expansion, increasing biogas investment risks parallel increases in greenhouse gas emissions.⁷⁴

Livestock production accounts for 36 percent of all methane emissions in the U.S.⁷⁵ Big Oil and Big Ag call their factory farm-derived biogas a “transformational opportunity” and “carbon negative” fuel,⁷⁶ and many top public officials are buying into it.⁷⁷ The reality, however, is much harsher — in fact, if digesters were installed at every dairy farm in the nation, they would not reduce the agricultural sector’s greenhouse gas emissions by even 25 percent.⁷⁸

This is partly because factory farm gas fails to address enteric fermentation, which contributes more to overall emissions than manure.⁷⁹ Enteric fermentation occurs in the digestive systems of ruminants like cattle and produces methane as a by-product. This alone accounts for 27 percent of U.S. methane emissions, while manure management contributes livestock’s remaining 9 percent (see Fig. 1).⁸⁰ Factory farm gas does nothing to address these emissions.

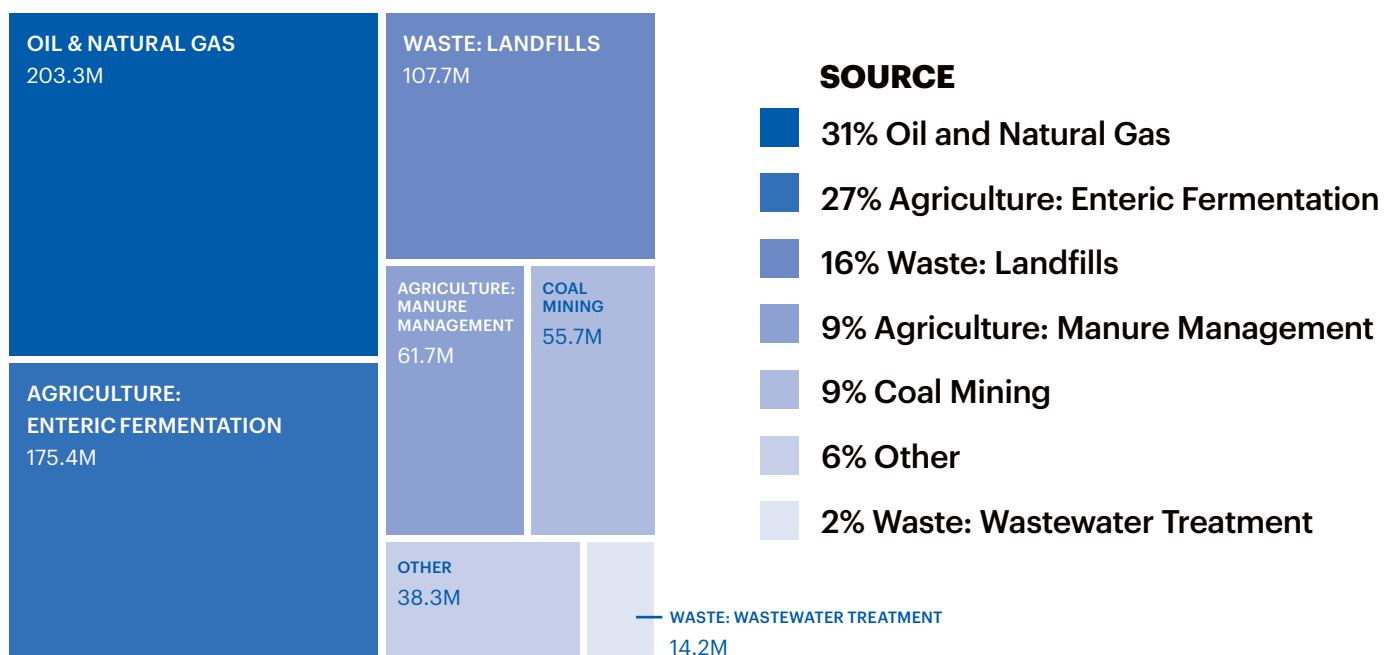
Digester systems are also riddled with leaks. Research shows that methane emissions along the supply chain are significantly underestimated — as much as double previous estimates.⁸¹ Just like in traditional oil and gas supply chains, super-emitters are a major, persistent

problem, with the highest 5 percent of emitters contributing over 60 percent of cumulative emissions.⁸² But unlike traditional systems, factory farm gas has much higher loss rates.⁸³ Methane leaks could be as high as a 15 percent loss rate, with the potential to release significant amounts of methane annually. Due to this, factory farm gas cannot be a zero-greenhouse gas emission fuel, let alone a negative emission fuel, at scale.⁸⁴

Some projects also require the use of propane to function. In one poultry litter study, because the digester was so ineffective at creating electricity, the system required over 4,300 gallons of propane annually to heat it. This obliterated any claims of climate benefits, instead generating over 1,100 percent of the climate change impacts that simply transporting unprocessed litter would have created.⁸⁵

As an end-use, burning factory farm gas produces the same pollutants as any fossil fuel source of energy.⁸⁶ On top of this, the transport of gas and materials to and from digesters still requires massive amounts of toxic diesel fuel.⁸⁷ Additionally, if the gas is not sent for upgrading to turn a profit off of, it may simply be flared off, releasing the gas back into the atmosphere.⁸⁸ When factory farm gas substitutes real renewable sources, like wind and solar, emissions will increase,⁸⁹ preventing a necessary transition away from fuel emissions and dooming us to climate chaos.

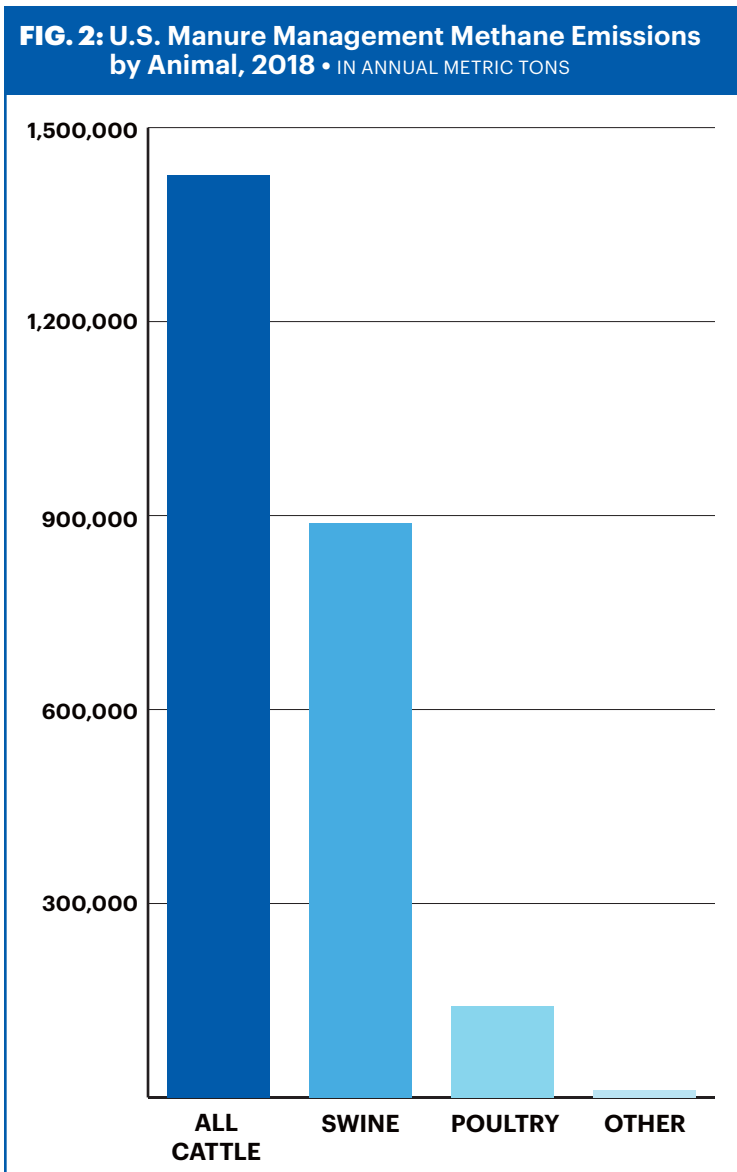
FIG. 1: Annual U.S. Methane Emissions by Source • IN MILLION METRIC TONS CO₂ EQUIVALENT



SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

For poultry digester systems, the emissions are even worse. Methane from poultry manure is less than 6.1 percent of that generated from cow and hog manure (see Fig. 2). Broilers, pullets, and turkeys, which represent over three-fourths of poultry, are commonly raised on bedding materials, also called poultry litter, which consist of wood shavings, straw, or rice hulls. This litter produces minimal methane emissions to begin with, making it unsuited for digestion.⁹⁰ So for most poultry digesters, when the system leaks or the gas is burned in cars, it generates new methane emissions that would not have existed without digesters.

Behind all of this, U.S. methane emissions are worsening, not improving. Since the Obama administration’s endorsement of dairy digesters in 2009, the industry’s methane emissions have risen by over 15 percent.



SOURCE: EPA

This is partly the result of growing herd sizes,⁹¹ a trend that will only worsen with continued biogas subsidies incentivizing growth.⁹² Factory farms are developing new projects or expanding existing herd sizes alongside the development of digesters, creating new sources of methane that did not exist before.⁹³

And since there are limited amounts of feedstocks, factory farm gas will never scale up enough to replace fossil or fracked gas,⁹⁴ enabling such a friendly relationship between Big Ag and Big Oil. When looking at all potential feedstocks, national assessments find that the available waste streams could only account for around 7 percent of U.S. natural gas consumption.⁹⁵ One state assessment found that gas from animal waste makes up less than 5 percent of this in all scenarios studied.⁹⁶

All told, this is an extremely dangerous trend for our climate, and it is being enabled by federal funding. Biden’s USDA continues to push full force for digesters despite these realities and pushback. Several U.S. senators raised concerns to the agency around the programs, writing that USDA has not produced evidence that subsidizing digesters will reduce absolute emissions.⁹⁷ If cows were raised sustainably on pasture, and there were fewer of them, the debate over manure methane emissions would not be a debate. Pasture-based systems do not produce significant emissions from manure, as pasture-raised cattle’s manure dries on pasture and produces negligible methane.⁹⁸ Instead, in efforts to maintain the status quo factory farm system, biogas systems are generating methane from leaky systems and, in some cases, worsening existing emissions.

All Talk, No Change

Big Oil is continuing to scale up oil and gas investments amid greenwashing

Big Oil is using “biogas” and similar industry-backed initiatives as smoke screens for the reality that they have no plans to turn away from oil and gas production and are instead planning increased exploration and production. Big Ag is doing the same, as they have no intention of turning away from the industrial factory farm system that fuels the climate crisis.

Chevron, BP, and Shell echo these sentiments in their strategic plans, with each planning to scale up their factory farm gas production over the next decade.⁹⁹ But their real goals, it is clear, remain in oil and gas —

overall oil production was 9,299 thousand barrels per day in January 2023, up from 8,436 thousand barrels per day in January 2022.¹⁰⁰

Amid huge profits, Big Oil has become emboldened enough to back away from its promises of a renewable future. BP reduced its emission pledges, dropping from 35 to 40 percent lower emissions by 2030 to just 20 to 30 percent.¹⁰¹ Shell spends a mere 1 percent of its capital expenditures on wind and solar, the only truly renewable energy sources in its portfolio. Even when Shell invests in greenwashed schemes, like factory farm gas or so-called carbon capture, its investment amounts to less than half of its oil exploration and production investments.¹⁰²

Smithfield is no better. Manure makes up the largest portion of the company's emissions, but it does not use the factory farm gas to power its own operations. Rather than using it on-site, the gas is largely sent outside of the company. Natural gas is still the dominant source of energy at Smithfield's U.S. facilities and farms, with even less factory farm gas used in 2021 than in prior years.¹⁰³ The company can instead cash in on the LCFS by piping or trucking gas from Missouri all the way to California.¹⁰⁴ Meanwhile, it has joined the USDA and EPA's list of "U.S. Food Loss and Waste 2030 Champions" as well as several other organizations with gaudy, greenwashed titles.¹⁰⁵ Since 2013, it appears that the key indicator of success in Smithfield's alternative energy campaigns is not reduced emissions — it is cost avoidance and better publicity.¹⁰⁶



Why Is It Greenwashing?

Factory farm gas entrenches dirty infrastructure, risks our health and climate, and threatens local economies

With these industries unleashing public relations campaigns and ads to convince the world of their new strategies,¹⁰⁷ it can be difficult to unravel the truth from the myths. But the truth about factory farm gas shows that the use of this gas is little more than a greenwashing campaign for both industries.

Factory farm gas entrenches and expands dangerous fossil fuel infrastructure

Despite all the industry's talk about what a transformative opportunity biogas is,¹⁰⁸ digester technology in fact necessitates extending the life of fossil fuel infrastructure, an intentional delay to a green transition.¹⁰⁹ Big Ag is firmly cementing ties to Big Oil, making its connections supposedly essential to a green future.

By nature, biogas for off-farm use requires several pieces of traditional fossil fuel infrastructure to function, the most insidious of which are pipelines. Pipelines are used to transport the gas to and from upgrading facilities, with Chevron, BP, Shell, and Smithfield's projects all requiring their use.¹¹⁰ Chevron admits that it contracts with farms that are near natural gas pipelines to scale up a "commercial project."¹¹¹

Gas pipelines are notoriously leaky pieces of fossil fuel infrastructure,¹¹² and factory farm gas projects take as given the use or build-out of pipelines. Creating biogas pipeline grids among clusters of digesters is one of the best ways for these companies to save money along the way, but it poses even more risks than traditional natural gas pipelines. This is due to the potential for overpressure from changes in demand and the toxic and corrosive properties of factory farm gas, endangering people and workers unfamiliar with the gas.¹¹³

Big Ag and Big Oil cannot be trusted to protect communities from their own creations as they plot to expand existing fossil fuel infrastructure. One of Smithfield's projects in North Carolina, for instance, is building out a 30-mile pipeline right through residents' backyards, but the company was reluctant to release any information on what steps it would take to protect people when explosions or leaks occurred.¹¹⁴ Residents

are right to be fearful, as pipeline accidents resulting from human error, natural disasters, and material corrosion are all but inevitable.¹¹⁵ Bioenergy Devco's project in Delaware is tied to similar pipeline expansions, potentially located adjacent to an elementary school.¹¹⁶ In their desperation to keep fossil fuel infrastructure relevant, these corporations once again dismiss people's lives and communities.

If pipelines are not used for transport, companies may turn to heavy shipping trucks after fuel upgrading or to transport feedstocks. The use of trucks often depends on the type of feedstock, with poultry litter being one of the more long-distance options,¹¹⁷ and is just another example of the collusion between these two industries. Bioenergy Devco's project could require an estimated 73,000 truck trips per year, many of which would not have occurred otherwise.¹¹⁸ The Shell-sponsored Nature Energy project boasts similar numbers, with a projected 90 to 100 trucks used daily to operate the facility 24/7.¹¹⁹

Since pipelines, gas grids, or trucks are the only available methods of transport, these companies aim to necessitate fossil fuel infrastructure remaining in place as long as factory farm gas remains in use.¹²⁰ Interconnection into existing natural gas systems is key for many of these projects, ensuring that gas products continue to heat people's homes or fuel their vehicles.¹²¹ The marriage of these two industries is just another tactic to avoid switching away from their profitable pollution and further entrench fossil fuels.

Factory farm gas will worsen local air and water quality

It is a well-documented fact that individuals living near factory farms face adverse health effects and higher mortality risks, not limited to kidney diseases, respiratory conditions, blood pressure elevation, and low birth weight.¹²² The companies behind this proclaim that their biogas projects will protect local air and water quality.¹²³ This is flatly not true, since factory farm gas fails to address many non-methane consequences of industrial factory farming, including air and water pollutants, and creates its own set of risks.

Non-greenhouse gas air pollutants from factory farms include ammonia, hydrogen sulfide, volatile organic compounds (VOCs), and particulates, among others.¹²⁴ While a good portion of emissions and pollutants are present before digestion takes place, factory farm gas construction and production will bring its own toxic

pollution — from the exhaust generated from the use of heavy equipment and vehicles to the potential odors that will come with the transport of manure and other material used for digestion.¹²⁵

Raw manure containing sulfur is converted to hydrogen sulfide in the digester, reaching over 4,000 parts per million in the gas. Usually, this is converted into sulfur dioxide and sulfuric acid air pollutants once burned, carrying their own risks.¹²⁶ Sulfur dioxide is an irritant for the respiratory system, and repeated exposure can cause bronchitis or other health issues, including decreased fertility.¹²⁷ Knowing this, a Smithfield project in Arizona filed for a permit to emit up to 80 tons of sulfur dioxide per year,¹²⁸ while simultaneously claiming that its projects create cleaner air.¹²⁹

Poultry litter digesters are especially dangerous. Poultry litter consists of animal waste, feed residue, feathers, and bedding materials, all of which possess low moisture content but high ammonia and nitrogen levels. One poultry litter digester was found to be nearly unusable due to high hydrogen sulfide contamination, with the system flaring over 70 percent of the internal gas.¹³⁰ When excess leftover digestate is applied to land afterwards, ammonia and nitrous oxide can evaporate into air as well.¹³¹

That threat of hydrogen sulfide pollution looms over every project. Another of Smithfield's facilities, Optima KV, had an early odor complaint from nearby residents from hydrogen sulfide emissions due to flaring.¹³² This substance is highly poisonous, corrosive, and flammable, posing risks to those living nearby.¹³³ Other trace pollutants, including lead, copper, and carcinogens like arsenic, are present in factory farm gas at higher levels than in fossil fuels.¹³⁴

Water quality problems from factory farms are similarly well-documented, stemming from manure lagoon leakage and runoff from spray fields. Each of these contaminate surface or groundwater and remain in use with factory farm gas production.¹³⁵ For instance, digesters do not solve nitrate contamination or phosphorus loading in soils or nearby waterways, since there is no monetary benefit to doing so. Liquid effluent, left over after production, is typically reapplied to land while still retaining nitrogen and phosphorus.¹³⁶ In fact, factory farm gas may lead to more excess nutrients leaching into soil or water than a fossil fuel alternative.¹³⁷

Moreover, the systems are also known to leak or break. A farm in North Carolina that accepted waste from Smithfield and sold biogas to Duke Energy illegally discharged fecal matter, liquefied hogs, and old meat into surrounding wetlands and the Nahunta Swamp. The farm repeatedly accepted more than it was permitted to and overfilled the lagoons. Even after reporting the accident, it took months before it was resolved, leaving behind groundwater with over 17 times the legal limit of ammonia.¹³⁸

Clearly, “green biogas” does not solve the problems with factory farms. Instead, by ensuring that factory farms are the primary source of this gas,¹³⁹ it will ensure that biogas’ growth is tied to that of factory farms and worsen pollution.

Factory farm gas threatens small producers and local economies

Over the past few decades, small and medium-sized farms have been decimated across the U.S. as agricultural giants dominate livestock production.¹⁴⁰ Now, Big Ag and Big Oil are arguing that biogas is the key to revitalizing local economies and family farms, as if the issue has merely been the lack of revenue from waste.¹⁴¹ The reality is that factory farm gas creates few jobs, and those that do exist are dangerous and unregulated. There are also few viable routes for small-scale farms, incentivizing factory farm growth at the cost of local farms.

Factory farm gas will create a handful of jobs for projects springing up across the country, but the job of handling manure is dangerous. Many animal agriculture workers are unprotected by labor laws, leaving factory farm gas expansion a risk to their safety. Working with biogas killed a farmworker in Iowa in 2021, and no federal agency was required to investigate. Expansion of herd sizes increases risk levels for workers, as increased waste and corresponding decreased air quality raises dangers for long-term illnesses.¹⁴²

This type of accident is no fluke. A study of factory farm gas accidents around Europe found that increased digester development has led to a higher number of operational accidents. The study examined more than 200 accidents and found that explosions and leaks resulted in a number of worker injuries on biogas plants. In more extreme instances, hazardous conditions at plants have led to worker deaths.

Researchers concluded that the number of accidents likely exceeds what is recorded.¹⁴³

Factory farm gas also does not help small family farms — quite the opposite. It drives the expansion of factory farms by putting more pressure on small and mid-sized farmers. Digesters in the U.S. are located on the largest 10 percent of dairies.¹⁴⁴ This gas incentivizes these large factory farms to continue producing and even expand, by turning what was once waste into a new, more profitable revenue stream. Factory farm gas distorts agricultural markets, putting smaller and more sustainable farms at a disadvantage.¹⁴⁵ This is because digesters are not cheap, costing up to \$5 million each, and in the case of dairies, they require at least 3,000 cows to operate profitably.¹⁴⁶

When Smithfield says that its projects benefit family farms,¹⁴⁷ it really means they benefit factory farms directly owned by or under contract with Smithfield. In the company’s Align RNG project, the 19 farms providing gas have a total of 250,000 hogs — an average of 13,000 each.¹⁴⁸ Shell’s projects trend the same way, with its new plants needing 15,000 cows within a 20- to 30-mile radius to run 24 hours a day.¹⁴⁹ Chevron similarly admits that it partners with farms that have the “scale” to “enable a commercial project.”¹⁵⁰ These are not the small farms that biogas proponents would lead one to believe, and the money follows a similar trail.



The slew of public incentives dedicated to propping up factory farm gas has turned manure into a commodity half as valuable as cow's milk.¹⁵¹ Funneled into greedy hands, these public incentives are only going to a few companies. For instance, all of California's Digester Research and Development 2022 awards went to just two companies: Maas Energy Works and CalBio. CalBio is known for its tight collaborations with Chevron and the dairy giant Land O' Lakes.¹⁵² The awards have trended like this for years, with CalBio receiving nearly \$100 million from 2015 to 2019.¹⁵³

Profits go straight to Big Ag and Big Oil, as they sell factory farm gas and collect as many low-carbon incentives as possible.¹⁵⁴ The LCFS, for example, gives Shell credits worth tens of millions of dollars every year for the company's factory farm gas.¹⁵⁵ Federal funding is also overwhelmingly directed to mega-dairies. According to the EPA's AgSTAR database, which tracks livestock anaerobic digesters across the country, only 10 of the 108 listed digesters that receive USDA funding fall below thresholds¹⁵⁶ for factory farms.¹⁵⁷

The truth is that these incentives are not designed for or accessible to small dairies. California's offset programs are simply one example of this, with the program used primarily by dairy farms of more than 1,000 cows.¹⁵⁸ Small hog farms would need government subsidies to cover over half of capital costs simply to break even.¹⁵⁹



But even then, the economies of scale work so that as methane (and therefore herd size) increases, costs decrease, further advantaging factory farms.¹⁶⁰ Should other states or regions take this incentive route, the factory farm gas industry will grow at the continued expense of America's small farmers.

Factory Farm Gas Perpetuates Environmental Injustices

Vulnerable communities remain at risk from increased factory farm gas production

Despite all the above, the most egregious effects of factory farm gas are those it has on low-income communities and communities of color across the country. Factory farms have long been disproportionately located in low-income and non-white areas, and those communities have borne the bulk of the harms associated with them.¹⁶¹ In particular, hog projects are concentrated in areas with higher Black, Latinx, and American Indian populations, meaning that digesters like Smithfield's will often be as well.¹⁶²

Align RNG has already announced projects in Sampson and Duplin counties in North Carolina, where half of the residents are Black or Latinx.¹⁶³ Nearly all residents live within three miles of hog operations.¹⁶⁴ Locals worry about their families' health and safety, particularly in these rural areas where infrastructure is weaker. They worry that emergency response teams would be unable to reach victims in the event of an explosion.¹⁶⁵

These concerns are valid — in Duplin County, researchers found that 89 premature deaths annually are directly caused by hog farm emissions.¹⁶⁶ Ammonia, in particular, is highly reactive and released by manure and fertilizer on farms. It is also notoriously difficult to detect and monitor.¹⁶⁷ Pathogens and other toxins contained in hog feces are sprayed onto fields, contributing to weakened immune systems and diseases like tuberculosis.¹⁶⁸

Similarly, Bioenergy Devco's project is located near communities of color. In Seaford, Delaware, people of color make up around 32 percent of the population within the three-mile radius of the proposed anaerobic digester. While this is a similar racial composition to the rest of the state, it is starkly different from the rest of Sussex County, which is 17 percent people of

color. Likewise, more than a third of the population within the three-mile radius lives below the poverty line, compared to 12 percent of Sussex County. And over half of the households within the three-mile radius of the facility have incomes below the state and county median household income, with nearly 30 percent of those households earning \$25,000 or less a year and 15 percent bringing home under \$15,000.¹⁶⁹

Communities that experience these environmental injustices experience underdevelopment and destabilization, adversely impacting the overall quality of life.¹⁷⁰ Since digesters fail to address the negative externalities associated with factory farms and even exacerbate them by incentivizing expanded herd sizes, these localities will only continue to face harms at the hands of Big Ag and Big Oil.

Conclusion

We cannot protect our climate and communities without combating Big Ag and Big Oil's greenwashing

For all the industry's talk about how much research must be done on solutions, we already know how to address these crises — by moving away from the factory farm model toward a more sustainable food system and halting all fossil fuel energy and infrastructure in favor of renewables. All the funding, federal and private, being funneled into digesters both props up

Big Agribusiness and diverts resources and attention from forward-looking solutions. Small-scale farms are much better off using alternative manure management practices, like composting, dry scraping, or pasture-based systems, which are cost-effective, faster to implement, and lower-emission.¹⁷¹

None of these solutions require the collusion of Big Oil, which is why the industry would prefer to rely on dirty factory farm gas and fossil fuel infrastructure. Investing in more fossil fuel infrastructure and building out pipelines to greenwash reputations intentionally prolongs gas dependence, delaying the shift to truly clean energy and emission reductions. These projects are cropping up fast, like Shell's project in Minnesota, which proposes to construct a massive industrial facility outfitted with 197-foot-tall exhaust stacks and 46-foot-tall gas tanks.¹⁷² Such a project is a crisis for local communities, and rather than continuing to prop up fossil fuel companies with incentives to produce more dirty energy, we must be quickly transitioning to a 100 percent renewable energy future.

Food & Water Watch recommendations:

- Congress must pass the Farm System Reform Act.
- Congress must stop subsidies for digesters.
- Congress must ban fracking.
- All levels of government must stop approving new gas infrastructure.



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