Executive Summary

Creating energy from animal manure has an intuitive appeal: Hundreds of millions of animals raised for food on U.S. factory farms each year produce massive volumes of waste that generate methane emissions, an extremely potent greenhouse gas. Anaerobic digesters can capture those methane emissions to produce so-called "biogas," which can generate electricity or be processed into transportation fuel. This strategy is the cornerstone of the Biden administration's methane reduction plan for the agriculture sector,[1] and the Inflation Reduction Act has infused billions of dollars into programs and tax incentives that can be used to support biogas production.

The stakes for this strategy to work are high. The world is on track to reach a 2°C increase in temperature this century, which will have catastrophic impacts, including for our food and agriculture system.[2] Rapidly reducing methane emissions, a short-lived greenhouse gas with a global warming potential 80 times higher than carbon dioxide over a 20-year time frame, is a crucial part of the pathway to limit global temperature increases.[3] The U.S. has joined more than 150 countries in signing the Global Methane Pledge to reduce methane emissions by 30% from 2020 levels by 2030.[4] Animal agriculture is the largest source of U.S. methane emissions, so focusing on climate solutions for this sector should be a priority.[5]

However, this report provides evidence that manure biogas will further entrench inherently unsustainable and unjust systems of industrial animal agriculture and fossil fuel energy for decades to come – all for methane reduction benefits that have been considerably overstated by the U.S. government, are inadequately tracked, and are insufficient to meet climate targets.

Manure biogas is incompatible with the goals of environmental justice and public health

Manure biogas systems are typically feasible only at the largest concentrated animal feeding operations (CAFOs), or factory farms, which are major drivers of climate change and other forms of pollution, disproportionately affecting low-income communities and communities of color. Manure biogas relies on the existence and perpetuation of CAFOs using the most hazardous manure management practices. It fails to address CAFOs' harms to rural communities, workers, farmed animals, and the environment. In fact, its production generates additional environmental, public health, and safety concerns for communities living near CAFOs and biogas plants, including increased production of ammonia during anaerobic digestion, higher concentrations of nutrients in the leftover material (digestate) that contribute to water pollution, new pipelines and trucks to transport manure or biogas through communities, and more toxic air pollution from biogas processing than is produced by fossil gas.

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We make the case that policies rewarding biogas production create three perverse incentives for CAFO operators and biogas producers: 1) to utilize inferior manure management practices that maximize methane production, 2) to increase herd sizes to maximize manure production, and 3) to increase consolidation to take advantage of the economies of scale inherent in biogas production. Each of these trends will exacerbate the environmental and public health harms associated with CAFOs and the harms from various stages of manure biogas production. The perverse incentives to utilize emissions-maximizing manure management practices and increase herd sizes also undermine manure biogas's key selling point: that it will significantly reduce methane emissions.

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Our report offers new evidence that methane reductions from manure biogas systems are overstated and insufficiently tracked by the U.S. government and that even these overstated reductions are insufficient to curb agricultural methane emissions in line with President Biden's commitment to the Global Methane Pledge. However, there are alternative agricultural methane reduction strategies that are both cost-effective and equitable.

President Biden's methane reduction plan for the agriculture sector largely relies on voluntary adoption of digesters and aspires to reduce methane emissions by only 9% by 2030. In contrast, we found that gradually reducing herd sizes as part of a just transition and implementing feasible alternative manure management practices at a large number of dairies can achieve more than half of the methane reductions needed to meet the Global Methane Pledge target for agriculture – and without all the environmental and health harms associated with manure biogas.

This report provides some of the first quantitative evidence that CAFOs with digesters are more likely to increase their herd sizes relative to statewide populations. We compared the herd sizes of 73 dairy facilities with digesters at the time the digester was installed with recent herd size data obtained from state permits, and our findings support the notion that policies rewarding biogas production incentivize increasing herd sizes. We also modeled emissions from these dairies to show how changes in herd sizes and different manure management strategies impact methane emissions.

Key findings of our original research:

1 Herd sizes at facilities with digesters grew 3.7% year-over-year, which is 24 times the growth rate for overall dairy herd sizes in the states covered by our data set. Overall, the 73 facilities with dairy digesters in our data set added nearly 85,000 dairy cows total. If these dairy populations continued to grow at their historical rates, each farm would add an average of 177 cows per year to their herds in the next year, producing 10 million pounds of waste per year – enough to fill more than 1,000 semi-trucks.

2 Accounting for these herd size changes and measuring the emissions reductions from a baseline of feasible alternative manure management strategies, the dairy CAFOs in our data set reduced their annual methane emissions by only 11% from the baseline year to the most recent year for which herd size data is available. This is nearly six times less than the reductions estimated using EPA's assumptions that there were no changes in herd sizes and that if these facilities did not have digesters, they would be utilizing the most methane-generating manure management strategy of a manure lagoon.

3 Installing dairy digesters will fall far short of the ambition needed to reduce agricultural methane emissions in line with President Biden's commitment to the Global Methane Pledge. Assuming 500 new dairy digesters were installed by 2030 and those digesters yielded emissions reductions comparable to those in our dataset, their associated methane emissions reductions would account for less than a quarter of the reductions needed to reduce agricultural methane emissions by 30%.

4 Reducing herd sizes and implementing feasible alternative manure management strategies on a large number of dairy farms could yield 55% of the reductions that are needed to slash agricultural methane emissions by 30% in 2030. We modeled reducing herd sizes by 20% and implementing feasible alternative manure management scenarios on 1,500 large dairies and found that this strategy would yield more than half of the reductions needed to reduce agricultural methane emissions in line with the Global Methane Pledge.

5 Paying dairy farmers to reduce their herd sizes would be nearly three times more cost-effective than subsidizing anaerobic digesters. If the government paid producers to reduce their herd sizes through a per-cow payout equal to the average net revenue per cow over the last ~20 years, the cost of mitigating one metric ton of CO_2e would be less than $10 total. This is nearly three times less than the cost of mitigating one metric ton of CO_2e by installing digesters, and it would be more consistent with administration's commitment to environmental justice. Paying farmers to reduce herd sizes or transition to another type of farming would also make dairy farming more profitable for the farmers who remain in the sector, because profits are currently suppressed by low prices driven by an oversupply relative to demand.

6 Data collection and disclosure from CAFOs with digesters is wholly insufficient to accurately measure methane emissions. Given the massive amount of public federal funding dedicated to subsidizing manure biogas, it is astonishing that neither the Environmental Protection Agency nor the Department of Agriculture is monitoring and reporting on methane emissions from CAFOs with digesters or collecting basic information such as animal populations in ways necessary to understand whether these investments are resulting in actual GHG reductions.

Incentivizing manure biogas production increases the competitive advantage for large-scale producers, contributes to industry consolidation, and crowds out funding for truly effective conservation practices.

Anaerobic digesters are expensive to construct and operate, making them economically feasible only for the largest farms and only with considerable public subsidies in most cases. This further tilts the playing field in favor of the largest livestock operators that are positioned to capitalize on policies and incentives rewarding manure biogas production, contradicting President Biden's commitment to ensure fair markets for livestock producers. Ironically – and tragically – pasture-based producers who are using the best (least methane-producing) manure management strategies in the first place are not able to produce and sell manure biogas since they do not collect waste in methane-producing lagoons, making it even harder for them to compete with CAFOs.

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These expensive subsidies and incentives are diverting tax dollars away from truly clean, renewable sources of energy like wind and solar and away from farmers and ranchers who want to employ agricultural conservation practices that have meaningful climate, soil, and water benefits. Because digesters and related infrastructure (e.g., lagoon covers) are so expensive to construct, grants and loans covering their capital costs comprise a considerable portion of the budget for several USDA conservation programs, which are consistently overdrawn. Plus, 22% of once-operational digesters are now shuttered, making digester subsidies an even more wasteful use of taxpayer resources.[6]

Moreover, because manure biogas requires expensive capital investments for infrastructure (e.g., anaerobic digesters, pipelines, and natural gas processing facilities), it will take years or decades for biogas companies and CAFO operators to recoup initial costs. Therefore, government support for building out manure biogas now risks locking us into the factory farming and fossil fuel systems that manure biogas production depends on for decades to come.

With a narrowing timeframe to stave off the worst impacts of climate change, we need aggressive action to reduce methane from the country's largest source – not voluntary measures that marginally reduce methane emissions while entrenching the highly polluting factory farming and fossil fuel systems driving climate change and environmental injustice in the first place. At a time when there is scientific consensus that high-polluting countries like the United States need to shift away from fossil fuels and

reduce industrial livestock production, support for manure biogas does the opposite. Manure biogas – or "factory farm gas" – is a greenwashing measure that actively undermines the Biden administration's commitments to fighting the climate crisis, achieving environmental justice, and ensuring fair markets for producers.

We conclude by offering the following policy recommendations:

Overarching policy recommendation:

Redirect resources currently supporting manure biogas (i.e., grants and loans for digesters, technical assistance, tax credits, and incentives for biogas production) to more cost-effective methane reduction solutions that do not exacerbate environmental injustice and industry consolidation. Instead, policies should support a just transition away from factory farming to regenerative agriculture and away from fossil fuels to truly renewable energy.

Additional policy recommendations:

1 Do not create new funding streams or other policy incentives for manure biogas.

2 Prevent double-dipping between subsidies, tax incentives, and programs like the Renewable Fuel Standard and California's Low Carbon Fuel Standard. Related, ensure GHG reductions attributed to manure biogas are not double-counted.

3 Set a specific methane reduction target and pathway for the agricultural sector aligned with the Global Methane Pledge.

4 Require and improve methane monitoring and reporting from livestock operations.

5 Pursue agricultural methane reduction strategies that support environmental justice and fair markets for producers:

- Methane emissions from industrial livestock facilities should be monitored, publicly disclosed, and regulated in a way similar to how the administration has approached regulating methane emissions from the oil and gas sector.
- Leverage procurement to shift federal purchasing and food service toward plant-forward menus, which have drastically lower embedded methane emissions.
- Prioritize funding for pasture-based livestock production in USDA conservation programs such as EQIP and REAP.
- Implement policies such as the Farm System Reform Act[7] that support a just transition to pastured animal production and plant-based food production, including placing a moratorium on large factory farms and providing voluntary buyouts for farmers who want to transition away from operating a CAFO.
- Reduce food waste.

6 Regulate waste from both CAFOs and digesters, including treatment and application of digestate.

7 Require disclosure of basic data from CAFOs and digester operators, and fund and conduct research to assess the impacts of manure biogas policies on methane emissions, industry consolidation, and rural communities.

8 In instances where public funds have already been designated to support manure biogas, grants and loans should include conditions and exclusions to reduce public health and environmental harms and increase transparency.


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