Livestock Partnerships

Description

When livestock manure is treated and stored in anaerobic conditions (e.g., as a liquid/slurry in lagoons, ponds, tanks, or pits), decomposition results in large emissions of methane, a GHG that is more potent than carbon dioxide with higher short-term impacts on the atmosphere. Managing manure to either encourage aerobic decomposition, which produces little to no methane, or capturing the methane through digester technologies or covers with flaring, can greatly reduce the GHG emissions from livestock production. USDA has a variety of programs that encourage these opportunities to reduce emissions while improving the economy of operations for farmers and ranchers.

Anaerobic digesters are one promising option for reducing GHG emissions from manure management by capturing methane and either combusting it for energy generation or processing it as a replacement for natural gas. Anaerobic digestion also provides a variety of co-products that can be used as fertilizer, bedding, and soil amendments.

In addition to anaerobic digesters, there are other technologies that reduce methane emissions from livestock operations. Lagoon and waste storage covers from which methane can be flared reduce those emissions, are much less expensive than digesters, and take much less management and maintenance. Enhanced solid separation can also significantly reduce methane emissions from liquid waste streams by removing solids before they can break down into methane. After removal, solids can be used for fertilizer, bedding, compost, or with another energy generation technology. Solid separators can be used in combination with a variety of other processing practices, including digesters and covers. Other technologies to reduce methane emissions include thermochemical conversion, incineration, gasification, and pyrolysis.

USDA has several programs that can support the installation of anaerobic digesters and other technologies that reduce GHG emissions from manure management practices. They include:

- EQIP, which includes conservation practice standards for both anaerobic digesters, solid separators, and roofs and covers with methane flaring;
- REAP, which supports anaerobic digesters through grants and loans; and
- Research, education, and extension programs to explore the development and implementation of technologies and practices that reduce methane emissions from animal manure.

Greenhouse Gas Reduction Goal

Goal[6]	GHG Reduction Goal ($MMTCO_2e$ per year by 2025)[7]
Install 500 anaerobic digesters.	6.1[8]
Cover lagoons and waste storage ponds and structures and flare captured methane from 10 percent of dairy cattle and market swine.	15.1[9]
Total	**21.2**

Partnership Opportunities

A challenge to widespread adoption of many of these technologies is that, without additional incentives such as streamlined power purchase agreements and payment for GHG reduction credits, they may provide little or no economic return to producers. For example, a small anaerobic digester may be feasible for a dairy farm owner to operate, but, without additional assistance, the products from its operation do not provide enough financial returns to justify its construction. A larger anaerobic digester may be more financially viable because it is able to produce more outputs (e.g., natural gas, electricity, and other bio-based products) per dollar of investment. At the same time, its operation requires a separate, full-time manager, which may not be possible for smaller operations. Individual USDA financial and technical assistance programs address some of these challenges, and agencies are developing partnerships both within USDA and with outside stakeholders to encourage these technologies.

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6 At this time, there is no quantified goal for installing solid separators. As part of the ongoing work related to this building block, a goal may be established.

7 For more information on how to interpret this goal, see p. 6.

8 Assumes the installation of 500 average-sized digesters, which reduce emissions by approximately 12,000 $MTCO_2e$ each (9,800 $MTCO_2e$ from avoided methane emissions and 2,200 $MTCO_2e$ from substituting for more GHG-intensive electricity generation). The same amount of emissions may be realized through fewer large digesters, which may also improve the long-term financial sustainability of these operations.

9 Assumes the installation of non-permeable covers with flares. Covers would be placed on manure storage structures for 900,000 dairy cattle and 11 million market swine, reducing methane emissions by 5.8 $MTCO_2e$ and 0.9 $MTCO_2e$ per animal, respectively. This goal would equate to approximately 3,600 covers on dairy operations (focusing on operations with more than 1,000 animals) and 1,800 covers on hog operations (focusing on operations with more than 1,000 animals). However, there may be fewer covers installed if they are used in operations with more animals.

CASE STUDY

Bob Giacomini operates a 720-acre dairy in Marin County, CA with daughters Karen, Diana, Lynn, and Jill. The dairy is the heart of the Point Reyes Farmstead Cheese Company, where the Giacominis make their award-winning cheeses and demonstrate sustainable farming practices. A leader in the dairy industry, Giacomini sat on the National Dairy Board from 1989 to 1995, including as President for his last 2 years of service.

Point Reyes Farmstead Cheese Company. Photo courtesy of the Giacomini Family and Kodiak Greenwood.

Like farmers across the State, his farm has faced record drought, and he has real concerns about having enough forage for his cows. He is not just worried about his 800 animals—he also wonders whether his farm will have enough drinking water since he relies on a well.

Giacomini's farm is at the forefront of conservation. Rotational grazing of their cows keeps soils healthy and helps prevent harmful erosion into Tomales Bay. To preserve their open space and working landscapes, they transferred their development rights to the Marin Agricultural Land Trust.

The Giacominis also use a methane digester to convert cow manure into clean, renewable energy that powers their dairy and cheese facility. The digester, which was installed in 2009, was funded in part by grants from the USDA Natural Resources Conservation Service, the California Energy Commission, administered by Western United Resource Development, Inc., and the Pacific Gas and Electric Company's Self Generation Incentive Program. Most recently, the Giacominis received a grant from USDA's Rural Energy for America Program. Electricity generated by the digester system is used to power dairy operations as well as on-site cheesemaking operations at the family's Point Reyes Farmstead Cheese Company. Hot water is recaptured from the system and used both in the milk parlor and in the cheese plant, saving approximately $1,000 a month on propane costs.

In addition to land stewardship, diversification is a key component of the Giacomini's operation. In 2010, they opened The Fork, a culinary and educational center situated on their property. Agri-tourism has been an integral component to the marketing and promotion of their products, and the experience creates brand loyalty for both trade and consumer customers who visit them from across the country. Their property is a model for the region and the dairy industry, and they have been recognized for their leadership with the 2013 Leopold Award.

"I've always felt it was the responsibility of a rancher and landowner to take care of the land for the next generation," said Giacomini.

For example, USDA Rural Development has developed a comprehensive plan which lays the foundation for sustained development of digester projects. This plan includes cooperation with NRCS, the Environmental Protection Agency's (EPA) AgStar Program, project developers, equity partners and lenders, industry partners, and producers. The plan is a multiyear effort that will work closely with feedstock suppliers and encourage the participation of Science, Technology, Engineering, and Mathematics students working through colleges and eXtension venues.

USDA and its partners have signed a variety of memoranda of understanding (MOU) to coordinate and encourage manure management and biogas technologies. The Rural Business-Cooperative Service (RBS) and NRCS have recently renewed and expanded an MOU on energy programs which allows the agencies to work closely together and coordinate programs. The agencies are exploring a coordinated program to encourage the adoption of anaerobic digesters by using EQIP funding for infrastructure installation and REAP funding to support electricity generation from the digester.

RD, NRCS, and EPA are also exploring an extension of the MOU to support the AgStar program, which promotes the use of biogas recovery systems to reduce methane emissions from livestock waste. This agreement would encourage USDA to take a more active role in managing that program to reach potential stakeholders that would otherwise be missed.

Finally, an MOU currently exists between USDA and Dairy Management Inc., a dairy industry group, to increase communication and cooperation between the entities, particularly in the areas of technology creation and adoption. Adopting similar MOUs with the other animal and energy industry groups would be beneficial.

There are additional opportunities to reduce GHG emissions by coordinating with wastewater treatment plants, food processors, and other organic waste generators. These partners may be able to reduce disposal costs by incorporating anaerobic digesters into their waste management plans. Reducing food waste sent to landfills through anaerobic digestion also provides a significant opportunity to reduce GHG emissions and generate cleaner electricity. EPA estimates that if 50 percent of food waste generated each year in the U.S. was anaerobically digested, the electricity produced would power 2.5 million homes for 1 year.[10] These partnerships are explored in detail in the Biogas Opportunities Roadmap, released in 2014, and its recent progress report from December 2015.[11]

[10] More information is available at **www.epa.gov/region9/waste/features/foodtoenergy/**.

[11] Available at **http://www.usda.gov/oce/reports/energy/Biogas_Opportunities_Roadmap_8-1-14.pdf** and **http://www.rd.usda.gov/files/Biogas-Roadmap-Progress-Report-v12.pdf**.

Proposed Actions

FY 2016

Action	Lead USDA Agency(s)
Recruit and train the additional NRCS and RBS technical professionals, and TSPs needed to provide direct technical assistance to producers to install and operate anaerobic digesters and the associated electrical generation equipment, covers with flares, solid separators, and other manure management technologies that reduce GHG emissions.	NRCS, RBS
Through REAP and EQIP, explore mechanisms to prioritize anaerobic digesters and the appropriate associated electrical generation technology, covers with flares, solid separators, and other manure management technologies that reduce GHG emissions.	NRCS, RBS
Publish a draft of the updated Conservation Practice Standard for Anaerobic Digesters (366).	NRCS
Support building block implementation through research, data, and tools related to manure storage, treatment, and utilization.	ARS

FY 2017

Action	Lead USDA Agency(s)
Recruit and train the additional NRCS and RBS technical professionals, and TSPs needed to provide direct technical assistance to producers to install and operate anaerobic digesters and the associated electrical generation equipment, covers with flares, solid separators, and other manure management technologies that reduce GHG emissions.	NRCS, RBS
Publish a draft of the updated Conservation Practice Standard for Waste Storage Facilities (313).	NRCS
Support building block implementation through research, data, and tools related to manure storage, treatment, and utilization.	ARS

FY 2018

Action	Lead USDA Agency(s)
Recruit and train the additional NRCS and RBS technical professionals, and TSPs needed to provide direct technical assistance to producers to install and operate anaerobic digesters and the associated electrical generation equipment, covers with flares, solid separators, and other manure management technologies that reduce GHG emissions.	NRCS, RBS
Support building block implementation through research, data, and tools related to manure storage, treatment, and utilization.	ARS